THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[Registered as a Newspaper.]

Vol. XXXV. No. 875.] LONDON, FEBRUARY 17, 1880. [32nd Year.] Price 6d.

GAS PURIFICATION
BY
OXIDE OF IRON.

COOKE BROS.,
CENTRAL DEPÔTS:
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LONDON DEPÔT:
BLACKWALL, E.;
OFFICES:
26, 27, & 28, FENCHURCH ST.,
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GENUINE TORBAY PAINT
And SPECIAL GASOMETER PAINT.
Several Prize Medals. Established over 20 Years.
These Paints are now used in over 200 Country Gas-Works, and by all the London Gas Companies, on Gas-holders, Scrubbers, Purifiers, &c. Also used by the Admiralty, War Office, Railway Companies, Founders, &c. They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations; do not crack, blister, or flake off; will cover tar effectually.
The covering powers are considerably greater than those of any other Paint.—*See "Engineer," Nov. 2, 1866.*
Supplied, mixed ready for use, or in paste, as desired.
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CONTRACTOR FOR
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FOR
Gas, Water, & Sanitary Purposes,
AND MANUFACTURER OF
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FOR
SCRUBBERS AND PURIFIERS.

COWEN'S PATENT FIRE-CLAY RETORTS.
JOSEPH COWEN and CO.,
BLAYDON BURN, BLAYDON-ON-TYNE,
Were the only parties to whom a Prize Medal was awarded at the Great Exhibition of 1851, for "Gas-Retorts and other Objects in Fire-Clay," and they were also awarded at the International Exhibition of 1862, the Prize Medal for "Gas-Retorts, Fire-Bricks, &c., for Excellence of Quality."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
COWEN'S GARESFIELD COALS.
Jos. Cowen & Co. are the only Manufacturers of Fire-Bricks and Clay Retorts at Blaydon Burn.

JOHN RUSSELL & CO.,
LIMITED,
Established at the commencement of Gas Lighting,
Manufacturers of
TUBES AND FITTINGS.
THREE PRIZE MEDALS,
Paris, 1878.
Head London Office:
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ALMA TUBE-WORKS, WALSALL;
OLD PATENT TUBE-WORKS, WEDNESBURY.

JOHN BENT & SON,
BELL BARN ROAD, BIRMINGHAM,
Manufacturers of
WET AND DRY GAS-METERS,
Licensees and Manufacturers of
HUNTS
PATENT COMPENSATING METERS
STREET-LAMPS, &c., &c.
Established 1830.

THOMAS PIGGOTT & CO.,
SPRING HILL, BIRMINGHAM,
Manufacturers of
TELESCOPIC & SINGLE GASHOLDERS,
CAST & WROUGHT IRON TANKS FOR DITTO,
And Gas Apparatus of every Description.
Marine, Tubular, Cornish, Plain, Furnace, Saddle, and Range Boilers.
Sugar, Saltpetre, and all kinds of Pans.
Roofs, Girders, and Bridges, and General Smith's Work
London Offices: 97, CANNON STREET—
JAMES E. & SAMUEL SPENCER, Agents.

THE
"OTTO" GAS-ENGINE.

See Page 230.

CROSSLEY BROTHERS,
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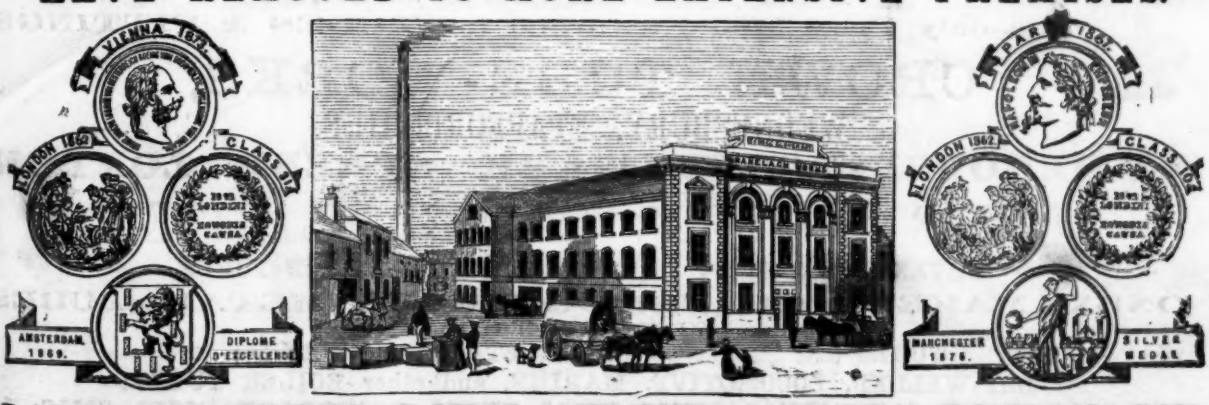
THE
DUKE OF HAMILTON'S
LESMAHAGOW
CANNEL COAL.
AGENT:
JAMES M'KELVIE,
HAYMARKET,
EDINBURGH.
ESTABLISHED 1840.

CHANGE OF ADDRESS.

GEORGE GLOVER AND CO.,

DRY GAS-METER MANUFACTURERS,

HAVE REMOVED TO MORE EXTENSIVE PREMISES:



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WELLINGTON TUBE WORKS,

GREAT BRIDGE, TIPTON, STAFFORDSHIRE.

JOSEPH AIRD,

GAS, STEAM, AND HYDRAULIC TUBES AND FITTINGS.

NO MORE WASTE LIME! SAVE THE VALUABLE PRODUCT!

G. R. HISLOP'S PATENT REGENERATIVE PROCESS

Most Effectively and Economically restores this waste *ad infinitum*.

The Patentee having devoted more time and attention to this subject than perhaps any other person living, is now in a position to recommend the adoption of this process to Gas Companies and Corporations with the utmost confidence in its practical utility, convenience, and economy. 1st. It restores the spent Lime at from one-third to one-half its original cost, apart from its undoubted convenience and the economy of space. 2nd. There is practically no limit to the duration of the Lime. 3rd. The cost of apparatus for the introduction of the process is very moderate and exceedingly durable. 4. The Patentee supplies special bricks and castings, erects and proves the process on the most favourable terms.

The process, in operation, may be seen at the Corporation Gas-Works, Paisley, where the Lime has been restored 120 times. Inspection is cordially invited.

For Terms, apply to GEO. R. HISLOP, F.C.S., Engineer, Gas-Works, PAISLEY, N.B.

ROBT. DEMPSTER & SONS,

GAS ENGINEERS, IRONFOUNDERS, AND CONTRACTORS,

ROSE MOUNT IRON-WORKS, ELLAND, YORKSHIRE.

MANUFACTURERS OF EVERY DESCRIPTION OF

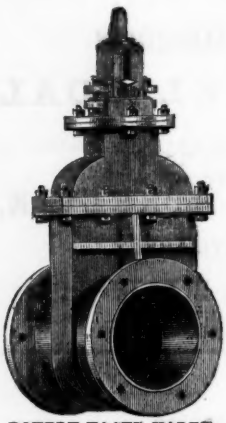
GAS APPARATUS;

CONTRACTORS FOR THE

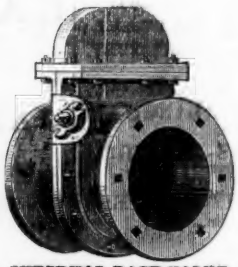
ERECTION OF PUBLIC AND PRIVATE GAS-WORKS.

Plans and Specifications Prepared, and Illustrated Catalogues forwarded on application.

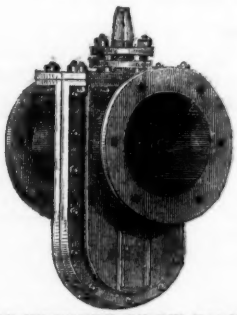
C. & W. WALKERS' GAS-VALVES.



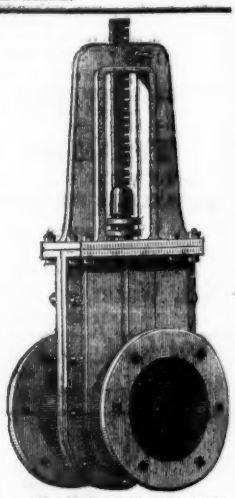
DOUBLE-FACED VALVE SPECIALLY FOR PURIFIERS.



INTERNAL RACK-VALVE WITH STEEL PINION, FOR GENERAL USE.



UNDERGROUND SCREW-VALVE FOR SHALLOW STREET-MAINS.



ORDINARY RACK AND PINION VALVE.

MIDLAND IRON-WORKS,

DONNINGTON, near NEWPORT, SHROPSHIRE; 8, FINSBURY CIRCUS, LONDON.

TRADE MARK.

THE MEDAL FOR 1862.

The only Prize Medal awarded for TUBES & FITTINGS.

CROWN TUBE-WORKS,

WEDNESBURY, STAFFORDSHIRE.

WAREHOUSE: SOUTHWARK STREET, LONDON.

JAMES RUSSELL & SONS, LIMITED,

PATENTEES & FIRST MAKERS OF WROUGHT-IRON TUBES,

ONLY MAKERS OF HOMOGENEOUS METAL TUBES.

MANUFACTURERS OF

TUBES and FITTINGS for GAS, STEAM, and WATER;

LAP-WELDED, LOCOMOTIVE, MARINE, and other BOILER TUBES;

HYDRAULIC TUBES, BEDSTEAD TUBES, WELL TUBES, TELEGRAPH POSTS, COILS, &c.,

GAS-FITTERS TOOLS. VALVES. COCKS, &c.

THOMAS PIGGOTT & CO.,

(Established 1822,)

SPRING HILL, BIRMINGHAM.

MANUFACTURERS OF

TELESCOPIC & SINGLE GASHOLDERS,

CAST & WROUGHT IRON TANKS FOR DITTO;

PURIFIERS, CONDENSERS, SCRUBBERS, RETORTS, VALVES;

IMPROVED WROUGHT-IRON RETORT-LIDS, CROSS-BARS, & SCREWS;

AND GAS APPARATUS OF EVERY DESCRIPTION.

SOLE MANUFACTURERS OF LIVESEY'S PATENT GASHOLDER MAN-LID,

By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder, or ingress of atmospheric air.

ROOFS, GIRDERS, BRIDGES, AND BOILERS OF ALL KINDS.

Drawings, Specifications, and Estimates supplied on application.

LONDON OFFICES: 97, CANNON STREET—JAMES E. & SAMUEL SPENCER, AGENTS.

EDWARD E. CROMBIE & CO.,

INVENTORS AND PATENTEES

OF THE

FRICTIONLESS DRY GAS-METERS,

Beg to intimate to Gas Companies and others that they are now prepared to supply these very superior Meters at the same prices as for the ordinary Gas-Meters.

In the construction of this Meter, for which the best tin plates only are used, every mechanical contrivance has been taken advantage of successfully to reduce the friction to a minimum, which is amply proved by the fact that they are made to work upon only one-fortieth of an inch pressure. By an improvement also in their construction, a steadier light is obtained, and greater capacity than can be got from any other Meter in the market. No gas can pass under the valves on any back pressure, as is the case with many other Dry Meters.

To Gas Companies supplying gas through streets with heavy gradients, these Meters are invaluable, as much gas is saved from the low pressure required to work them.

ALL METERS ARE UPHELD FOR FIVE YEARS.

METROPOLITAN WORKS, DIANA PLACE, EUSTON ROAD, LONDON, N.W.

SAMUEL CUTLER & SONS,

CONTRACTORS FOR GAS & WATER WORKS, GENERAL ENGINEERS, IRONFOUNDERS & MANUFACTURERS OF

GASHOLDERS, TANKS, PURIFIERS,

SCRUBBERS, VALVES, EXHAUSTERS, IRON ROOFS, BRIDGES, BOILERS, AND GENERAL CAST AND WROUGHT IRON WORKS.

S. C. & SONS undertake the entire erection of New, or Remodelling of existing Gas-Works in any part of the World, including small Works for MANSIONS, FACTORIES, &c., or Works of the largest extent (are now constructing the largest Gasholder yet erected); also the supplying and laying of MAINS.

They make a speciality of supplying every requisite whatever for Gas-Works, keeping in Stock what are most in request. WOOD SIEVES for Purifiers and Scrubbers, of a superior make.

SPECIAL CASTINGS to Drawing or Pattern at Shortest Notice.

Manufacturers of MORRIS & CUTLER'S PATENT CONDENSER & CUTLER'S PATENT GAS-WASHER.

DESCRIPTION OF MORRIS & CUTLER'S PATENT CONDENSER.—The Condenser may consist of pipes arranged in tiers, or in any other form most convenient to the site available, each tier being connected with special connections, and containing within same either one or more coils of smaller pipe through which water is passed, being supplied from any convenient source of supply, the water passing in an opposite direction to the gas, so that the coldest water is at the gas outlet. The power of the Condenser can be regulated precisely in proportion to the quantity of water allowed to pass through, which is not in any way contaminated, but simply heated by the hot gas, and advantage can be taken of its being at a high level to carry it to a high-level cistern, from whence it can be used for supply to boiler or any other purpose. The Condenser itself may form the support for a high-level cistern. By an arrangement of valves the water may be shut off, and an air orifice opened, when air will pass through instead of water, or both air and water can be shut off. The power of the Condenser is, therefore, entirely under control. The Condenser may be seen in operation at the Brentford Gas-Works.

For further Particulars, apply to Mr. F. MORRIS, GAS-WORKS, BRENTFORD, or to S. CUTLER & SONS, PROVIDENCE WORKS, MILLWALL (Near the Steamboat Pier), LONDON, E.

DANIEL HOWARD,

(Successor to the late BENJ. WHITEHOUSE),

GASHOLDER AND BOILER WORKS,

WEST BROMWICH, NEAR BIRMINGHAM (Established 1765),

MANUFACTURER OF

TELESCOPIC AND SINGLE GASHOLDERS,

WROUGHT AND CAST-IRON TANKS FOR DITTO.

PURIFIERS, CONDENSERS, SCRUBBERS, HYDRAULIC MAINS, AND ALL KINDS OF GAS APPARATUS.

WROUGHT-IRON ROOFS, BRIDGES, GIRDERS, ETC.

STEAM, HOT WATER, AND RANGE BOILERS, TANKS, CISTERNS, BOATS,

AND ALL KINDS OF WROUGHT-IRON WORK.

Drawings, Specifications, and Estimates supplied on application.

GAS PURIFICATION
BY
OXIDE OF IRON.
GAS PURIFICATION & CHEMICAL Co., LIMITED,
PALMERSTON BUILDINGS, OLD BROAD STREET, LONDON, E.C.

JOHN WM. O'NEILL, Managing Director.

GAS *v.* ELECTRIC LIGHT.
WIGHAM'S PATENT LIGHTHOUSE GAS-BURNERS,
For Street Lighting and the Illumination of Large Halls, Factories, Ship Yards, &c., where Powerful Light is required.

These Burners have been adopted by a School Board, having large school-rooms in charge, because of their high illuminating power and the facilities they give for perfect ventilation. The actinic power of these Burners is such that they are used successfully for Photography and Photo-Lithography.

SOLE MANUFACTURERS:

J. EDMUNDSON & CO., Gas Engineers, 19, GREAT GEORGE STREET, WESTMINSTER, LONDON, S.W.

HANNA, DONALD, & WILSON,
(ESTABLISHED 1851,)

GAS ENGINEERS & CONTRACTORS

FOR THE

ERECTION OF GAS AND WATER WORKS,

TELESCOPIC AND SINGLE-LIFT GASHOLDERS,

CAST AND WROUGHT IRON GASHOLDER-TANKS,

IMPROVED FIXED OR TRAVELLING HYDRAULIC PURIFIER-COVER LIFTERS,

PURIFIERS, CONDENSERS, SCRUBBERS, EXHAUSTERS, AND PUMPING-ENGINES,

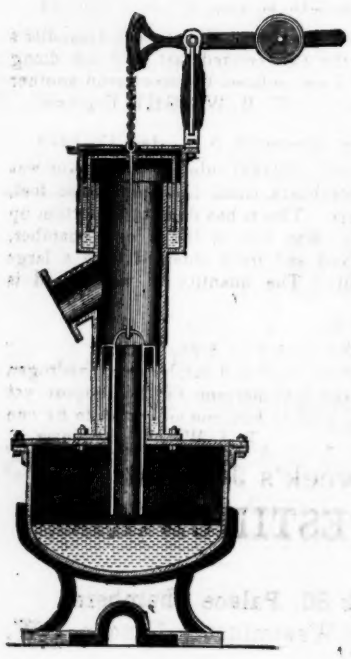
TAR AND LIQUOR PUMPS, HYDRAULIC SLUICE AND SLIDE VALVES, LAMP-POSTS AND HYDRANTS COMBINED.

DESIGNS AND ESTIMATES SUPPLIED ON APPLICATION.

London Office: 9, FENCHURCH STREET, E.C.

ABERCORN FOUNDRY & ABBEY WORKS, PAISLEY, N.B.

SELF-ACTING REMOVABLE DIP-PIPE,
PATENTED BY
CHANDLER & STEVENSON.



The following Testimonials, as to five years constant working of this Patent Removable Dip, have been received:—

Metropolitan District Asylum Gas-Works, Caterham, Surrey, Jan. 15, 1874.

Messrs. Chandler and Sons.

Dear Sirs,

In reply to your inquiries, I beg to inform you that since I have used your Patented Dips (ten in number), I find my make has increased over 1000 cubic feet per ton of coal carbonized, my usual make being 9070 cubic feet before using your Dips, and 10,150 cubic feet since using them.

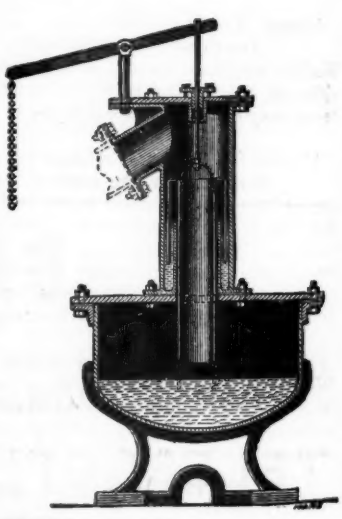
Metropolitan District Asylum Gas-Works, Caterham, Surrey, Dec. 30, 1879.

Messrs. Chandler and Sons.

Dear Sirs,

In reply to your inquiry, it is with very much pleasure that I endorse every word of my letter of Jan. 15, 1874; and I may add that from the date the Patent Dips were fitted, they have worked perfectly, and there is very little carbon deposited in the retorts, in consequence of the lower pressure.

Yours faithfully,
(Signed) W. CRICKMAY,
Memb. Soc. Engineers.



APPLICATIONS TO BE MADE TO

Messrs. CHANDLER & SONS,

104, NEWINGTON CAUSEWAY, S.E.

KIRKHAM, HULETT, & CHANDLER, LIMITED.

PATENT "STANDARD" WASHER-SCRUBBER,

FOR

GAS PURIFICATION,

TAKES OUT EVERY TRACE OF AMMONIA AND A LARGE QUANTITY OF CARBONIC ACID AND SULPHURETTED HYDROGEN BY ONCE PASSING THROUGH THE MACHINE.

AMMONIACAL LIQUOR OBTAINED OF ANY REQUIRED STRENGTH.

The Cost of the Machine defrayed by the Ammonia obtained in Twelve Months.

It requires very little attention, and cannot get out of order.

THESE MACHINES HAVE BEEN SUPPLIED TO THE FOLLOWING GAS-WORKS:—

	Feet per Day.
The Gaslight Company, London—	
Beckton	5,000,000
Bromley	7,000,000
St. Pancras	3,000,000
Bradford Corporation	1,000,000
Bremen	150,000
Buxton Local Board	250,000
Dukinfield Local Board	500,000
Driffield Company	100,000
Goole Company	250,000
Glossop Company	300,000
Holywood Company	125,000
Heywood Local Board	600,000
Leeds Corporation	2,000,000
Leominster Company	150,000
Maidstone Company	1,000,000
Phœnix Company, Greenwich	2,500,000
" " Vauxhall	3,000,000
Woolwich Equitable Company	400,000
Yeadon Company	500,000

AND MANY OTHERS ARE IN COURSE OF CONSTRUCTION.

TESTIMONIALS.

Messrs. KIRKHAM, HULETT, and CHANDLER. *Engine-Works, Millbank, Westminster, S.W., March* 5, 1879.

Gentlemen,—In accordance with your instructions, I have taken diagrams from Vertical Engine driving your Patent Horizontal Washer-Scrubber to purify 60,000 feet of gas per hour on the works of The Gaslight Company at King's Cross, and find the following results, viz.:—

Horse power required to drive engine, shafting, and gearing alone	= 0·398
Total horse power with washer on	= 1·721
Absolute horse power required to drive Washer-Scrubber	= 1·323

(Signed) THOS. HORN.

Messrs. KIRKHAM and HERSEY. *The Gaslight and Coke Company, Bromley-by-Bow, E., June* 2, 1879.

Gentlemen,—I have much pleasure in stating that the results of the working of Kirkham, Hulett, and Chandler's Washer-Scrubber, erected at these works in 1877, have been perfectly satisfactory, and that the two erected last year are doing well—all that you guaranteed; indeed, the effectiveness of the machine is so convincing, that I am induced to recommend another being ordered if you can undertake to have it erected complete before next winter. (Signed) W. B. WRIGHT, Engineer.

Messrs. KIRKHAM and HERSEY. *Phœnix Gaslight and Coke Company, Office, Greenwich, S.E., Aug.* 12, 1879.

Gentlemen,—In reply to your inquiry, one of your Patent Scrubber-Washers to purify 100,000 cubic feet per hour was put into operation at these works on the 1st of June. At the same moment the whole of our Scrubbers, equal to 28,000 cubic feet, were thrown out of use, leaving your Washer the whole work of freeing the gas from Ammonia. This it has done to perfection up to date. With 10 gallons of water to each ton of coal carbonized passing through it we get a clean test at the seventh chamber, leaving four chambers margin for extra work. The mean quantity of Ammonia in the inlet (fixed and free) obtained from a large number of tests was 241 grains per 100 feet of gas. On the outlet—Free Ammonia—Nil. The quantity of water used is 10 gallons per ton of coal carbonized. The strength of liquor as follows:—

Chamber No.	1	2	3	4	5	6	7	8	9	10	11
Strength of liquor—ounces	Nil.	Nil.	Nil.	Nil.	0·4	1·0	2·2	3·5	5·5	8·25	12·5

We are working five revolutions per minute. It takes out all the free Ammonia, reduces the carbonic acid and sulphuretted hydrogen 30 per cent., requires a very small amount of power to drive, and altogether is, in my opinion, the best machine for the purpose yet invented, and will, I feel confident, ere long, entirely supersede the Scrubbers of to-day. I am glad to find you are going to fix one of these Washers at our Vauxhall works. (Signed) P. J. WATES, Engineer.

For Results and other Testimonials, see next week's Journal.

FOR FURTHER PARTICULARS AND TESTIMONIALS, ADDRESS MESSRS.

KIRKHAM, HULETT, & CHANDLER, LIMITED, { 59 & 60, Palace Chambers, Bridge St. Westminster, London, S.W.

AN ENGINE WHICH WORKS WITHOUT A BOILER OR STEAM

AVERAGE WEEKLY DELIVERY
(INCLUDING CONTINENTAL)
OVER TWENTY ENGINES.

The durability of these Engines is now established by experience, one of them having run night and day at the Hinckley Gas-Works for over Twelve months without any expenditure for repair; this being equal to about 2½ years average work.

Over 1900 already delivered.

Very numerous Testimonials from Users, including Engineers, Men of Science, and others, on application to the makers.

No trouble with Coal, Ashes, Smoke, Insurance, Water, or constant attendance.

No Glands to pack, or Water Gauges and Steam Gauges to watch.

STARTS AT A MOMENT'S NOTICE.

THE "OTTO" SILENT GAS-ENGINE.

(Otto and Crossley's Patents, 1876 and 1877.)

THEY ARE USED FOR ALL KINDS OF PURPOSES, CHIEFLY FOR EXHAUSTERS, SCRUBBERS, & PUMPS.

DELIVERED IN MANCHESTER. SIZES { NOMINAL HORSE POWER ½ 1 2 3½ 6 8 12 16 / MAXIMUM HORSE POWER ¾ 1½ 2½ 4 9 12 18 24 } OFFERED. CASES NOT CHARGED IF RETURNED FREE.

PRICES INCLUDE CAST-IRON STAND, TURNED FLY-WHEEL, AND DRIVING PULLEY; WATER-VESSEL, SEVERAL DUPLICATES, AND GAS-FITTINGS (EXCEPTING METER AND PIPES).

WORKS AND HEAD OFFICES: Gt. Marlbro' St., Gloster St.

CROSSLEY BROTHERS, MANCHESTER.

LONDON HOUSE: 116, Queen Victoria St., E.C.

THE NEW GAS COOKER.

40 PER CENT. OF GAS SAVED.

No. A510 same as our **No. A152,**
But Lined with Patent Non-Conductor.
Will Roast, Bake, and Fry, and with Three Burners for Boiling.

SIZE.
Outside—30in. high, 20in. wide, 20in. deep.
Inside—19½in. „ 14in. „ 17in. „
Price . . . . . £4 14s. 6d.

No. A500.
Lined with Patent Non-Conductor.
Is fitted with Roasting and Baking Oven and Four Burners for Boiling.

SIZE.
Outside—34in high, 20in. wide, 19in. deep.
Inside—30in. „ 16in. „ 17in. „
Hot Plate—24in. by 23in.
Price . . . . . £7 10s. 0d.

No. A505.
Same as with Roasting and Baking Oven, a Broiler or Toaster, a Chop Griller, a Hot Water Boiler, and Three Burners for Boiling.
Hot Plate—26in. by 24in.
Price . . . . . £9 15s. 0d.

These Cookers are jacketed, on the sides, top, and door, with a new and very efficient non-conducting material, by the use of which a **saving** of gas to the extent of **40 per cent.** is effected.

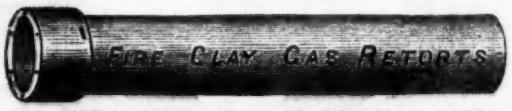
Gas Companies who are selling or hiring stoves should see these stoves. Catalogues and particulars on application to

JOHN WRIGHT & CO., ESSEX WORKS, BROAD STREET, BIRMINGHAM.

London Warehouses: { 155a, Upper Thames Street, / 1, Little Bush Lane.

EDWARD BROOKE AND SONS,
FIELDHOUSE FIRE-CLAY WORKS, HUDDERSFIELD,
MANUFACTURERS OF
GAS-RETORTS, FIRE-BRICKS, &c.,
Which have been extensively used for 30 years in the construction of Glass Furnaces, where the heat is five times greater than in Gas Ovens; superior to any Retorts or Fire-bricks in the market for standing intense heats, and not contracting.

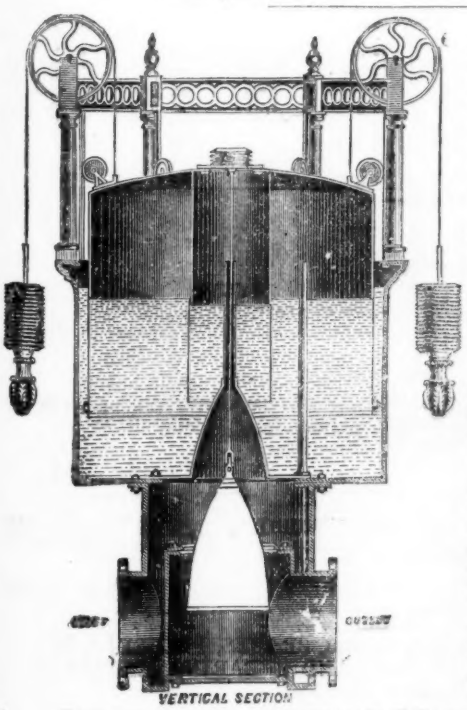
JOHN HALL AND CO., STOURBRIDGE,
Manufacturers of FIRE-BRICKS, LUMPS, TILES,



AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.
N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

J. & H. ROBUS,
BUILDERS AND CONTRACTORS
FOR THE ERECTION AND REBUILDING OF GAS AND WATER WORKS,
RETORT-SETTING—A SPÉCIALITÉ.
ROBUS'S IMPROVED RETORT-SETTINGS, guaranteed to Carbonize a large amount of Coal with a small per cent. of Fuel.
ESTIMATES GIVEN FOR MAIN-LAYING.
N.B.—All kinds of Fire Goods and Gas Apparatus supplied on the shortest notice.
Address:—J. & H. ROBUS, BELL GREEN, CATFORD, LONDON, S.E.

J. & J. BRADDOCK,
GLOBE METER-WORKS, OLDHAM,
MANUFACTURERS OF
WET AND DRY CONSUMERS GAS-METERS,
OF THE HIGHEST EXCELLENCE ONLY;
ROUND STATION-METERS,
ON CAST-IRON STANDS;
SQUARE STATION-METERS,
WITH PLANED JOINTS.
Messrs. Braddock beg to submit to Gas Engineers their
PATENT COMPENSATING GAS GOVERNOR,
Which is designed to give an uniform pressure at the Outlet to the Main at all draughts up to the full quantities which the Governors are made to control, such outlet pressure being less than the initial pressure.



VERTICAL SECTION.

The uniformity of pressure is obtained by introducing a compensating chamber into the Bell or Holder of the Governor, which compensator is of the same area as the valve, both of which are operated on by the initial pressure, thereby placing the valve in equilibrium, no matter what the initial pressure may be. The action on the Bell is by the Gas passing along a pipe from the outlet, and the pressure is regulated by weights in connexion with the Bell as required.

From the sectional elevation attached hereto, it will be seen that only the Gas required to operate the Bell comes in contact with the water of the tank, which water will remain comparatively sweet and free from odour. That in case of accident to the Bell, no more Gas can escape than would pass up the pipe covering the valve-rod and Bell supply-pipe.

These Governors have been made and sent out of various sizes for from 2 to 30-inch Mains, and give most satisfactory results.

They can be made with Float in the Bell, or counterpoise as per section.

C. & W. WALKER'S
WOOD PURIFIER SIEVES,
Which have now been used for fifteen years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.
MIDLAND IRON-WORKS,
DONNINGTON, Near NEWPORT, SHROPSHIRE.
FINSBURY CIRCUS, LONDON.

MOBBERLEY & PERRY,
FIRE CLAY and BRICK WORKS,
STOURBRIDGE.
Proprietors of
BEST GLASS-HOUSE POT and CRUCIBLE CLAY.
Manufacturers for Home and Export.
GAS-RETORTS, GLASS-HOUSE FURNACE,
BLAST-FURNACE, TANK BRICKS, LUMPS, TILES,
And Every Description of Best Fire-Bricks.

TROTTER, HAINES, & CORBETT,
BRETTELL'S ESTATE
FIRE CLAY & BRICK WORKS,
STOURBRIDGE.
Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS LUMPS, TILES, and every description of FIRE-BRICK.
Proprietors of
BEST GLASS-HOUSE POT and CRUCIBLE CLAYS.
Shipments Promptly and Carefully Executed.

ESTABLISHED IN 1860.
BENJAMIN CARPENTER,
THE ORIGINAL MANUFACTURER OF THE IMPROVED
WOOD SIEVES
FOR
GAS PURIFIERS & SCRUBBERS.
PROVIDENCE WORKS,
22, HERMES STREET, PENTONVILLE ROAD,
LONDON, N.

The Dunston Engine Works Co.,
GATESHEAD-UPON-TYNE.
Are the Sole Manufacturers of
Archer's Patent Hoists,
ALSO OF
Archer's Patent Stone Breaker,
AND OF
Archer's Patent Ore Crusher & Pulveriser,
The last-named Machine (without the Pulveriser) makes the best and most durable Coke Breaker.

"TANNIC GELATINE,"
FOR
REMOVING AND PREVENTING INCRUSTATION OF EVERY DESCRIPTION OF STEAM BOILERS; ALSO CORROSION.
Manufactured only by
WILLIAM RICHARDSON,
GAS ENGINEER,
94, CHARLES HENRY STREET, BIRMINGHAM.

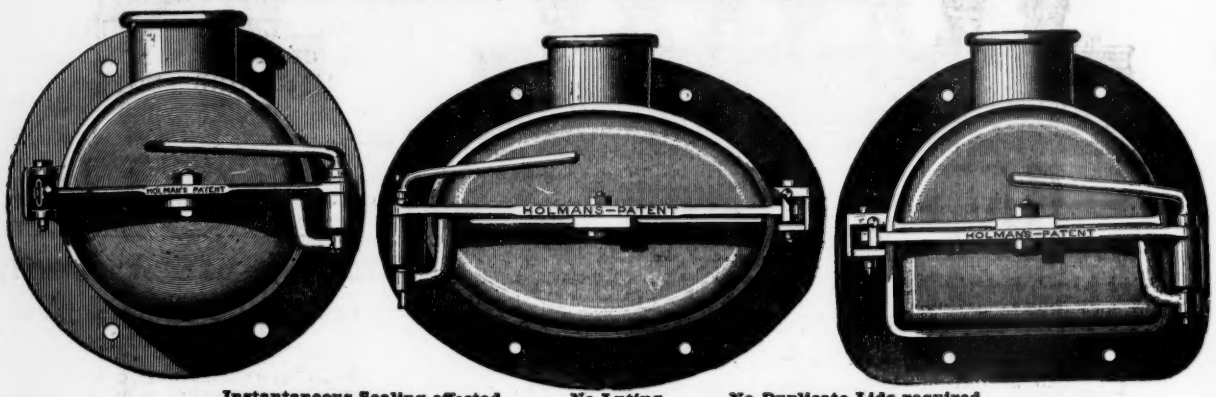
Gold Medal Awarded, Paris Exhibition, 1878.
THOMAS TURTON AND SONS,
SHEAF AND SPRING WORKS,
SHEFFIELD,
MANUFACTURERS OF
FILES OF BEST QUALITY
FOR ENGINEERS,
STEEL OF ALL DESCRIPTIONS,
SCREW STOCKS, TAPS, AND DIES, SPANNERS,
RATCHET BRACES, LIFTING-JACKS,
ANVILS, VICES,
AND ENGINEERS TOOLS GENERALLY.
LONDON OFFICE:
90, CANNON STREET, E.C.

TANGYE BROTHERS AND HOLMAN,

CORNWALL HOUSE, QUEEN VICTORIA STREET, LONDON, E.C.,

SOLE MAKERS OF MORTON'S PATENT SELF-SEALING RETORT-LIDS,

WITH HOLMAN'S PATENT ECCENTRIC FASTENINGS,
Anti-Friction Catches, and Self-Sustaining Cross-Bars.



Instantaneous Sealing effected. No Luting. No Duplicate Lids required.
Holman's New Self-Sustaining Cross-Bar ensures freedom of Joint, and maintains parallel position of the Lids.

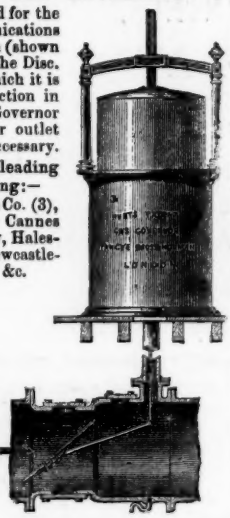
Morton's Patent Retort-Lids are in use in nearly all the Principal Gas-Works in the United Kingdom and the Colonies; also on the Continent and in the United States of America. They are now made of the

SAME FORM OR SECTION AS THE RETORT. (See Illustrations above.)

Engineers preparing Specifications of New Works will be furnished with Dimensions of Stock Patterns, together with Approximate Weight and other data on application.

HUNT'S
EQUILIBRIUM DIRECT-MAIN GAS GOVERNOR.

In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown in the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.



These Governors have been adopted by many leading Gas Companies, among whom are the following:—

The Gaslight & Coke Co. (19), The London Gas Co. (3), and at Abergavenny, Arundel, Birmingham, Cannes (France), Devonport, Dursley, Exeter, Guernsey, Halesowen, Leicester, Mentone (France), Monmouth, Newcastle-on-Tyne, Oxford, Plymouth, Rochdale, Windsor, &c.

TESTIMONIAL.

The Gaslight and Coke Company,
9, Water Street, New Bridge Street,
Blackfriars, E.C., Feb. 27, 1875.

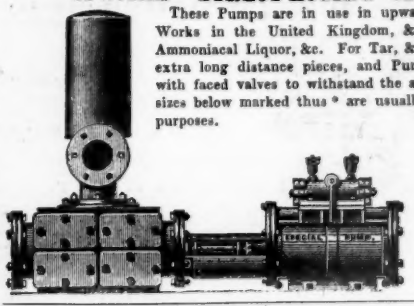
MESSRS. TANGYE BROTHERS AND HOLMAN.

Gentlemen,—The two 24-inch and three 36-inch Hunt's Equilibrium Governors supplied by you, and fixed in the valve-rooms at Whitechapel, Goswell Road, and Blackfriars, are working very satisfactorily.

Yours truly,
(Signed) JOHN JOHNSON.

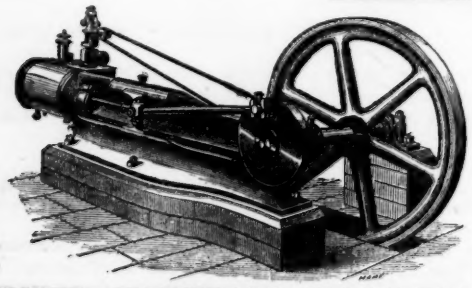
THE
"SPECIAL" DIRECT-ACTING STEAM-PUMP.

These Pumps are in use in upwards of one hundred Gas-Works in the United Kingdom, &c., pumping Water, Tar, Ammoniacal Liquor, &c. For Tar, &c., they are provided with extra long distance pieces, and Pumps are entirely of iron, with faced valves to withstand the action of the liquid. The sizes below marked thus * are usually kept in stock for these purposes.



The quantities delivered of Tar should be taken about two-thirds that of water.

Diameter of Steam Cylndr.	Diameter of Water Cylndr.	Length of Stroke.	Gals. of Water per Hour, Approx.	Prices for Water.	Prices for Tar and Ammoniacal Liqr.
*3 in.	1¼ in.	9 in.	450	£16 0 0	£17 0 0
*4 ,,	2 ,,	9 ,,	815	18 0 0	19 0 0
*5 ,,	2¼ ,,	12 ,,	1,250	21 0 0	23 10 0
*5 ,,	3 ,,	12 ,,	1,830	22 10 0	24 0 0
*6 ,,	3 ,,	12 ,,	1,830	25 0 0	26 10 0
*6 ,,	4 ,,	12 ,,	3,250	30 0 0	31 10 0
6 ,,	5 ,,	12 ,,	5,070	35 0 0	36 10 0
*7 ,,	5 ,,	12 ,,	5,070	40 0 0	41 10 0
7 ,,	6 ,,	12 ,,	7,330	45 0 0	46 10 0
*8 ,,	6 ,,	12 ,,	7,330	50 0 0	52 0 0
10 ,,	6 ,,	12 ,,	7,330	60 0 0	62 10 0
10 ,,	8 ,,	12 ,,	13,000	75 0 0	77 10 0

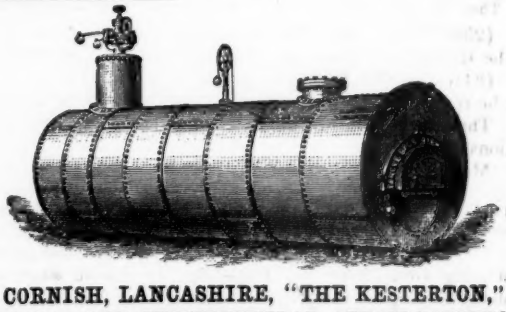


TANGYE'S HIGH-PRESSURE STEAM-ENGINE,
NEARLY 4000 IN USE.

The Design, Workmanship, and low prices of these Engines have called forth universal approval.

Nom. H.P.	2	3	4	6	8	10	12	14	20	25
	£28	£37	£44	£68	£86	£111	£122	£133	£185	£215

Including Governor and Feed Pump. Variable Expansion extra.



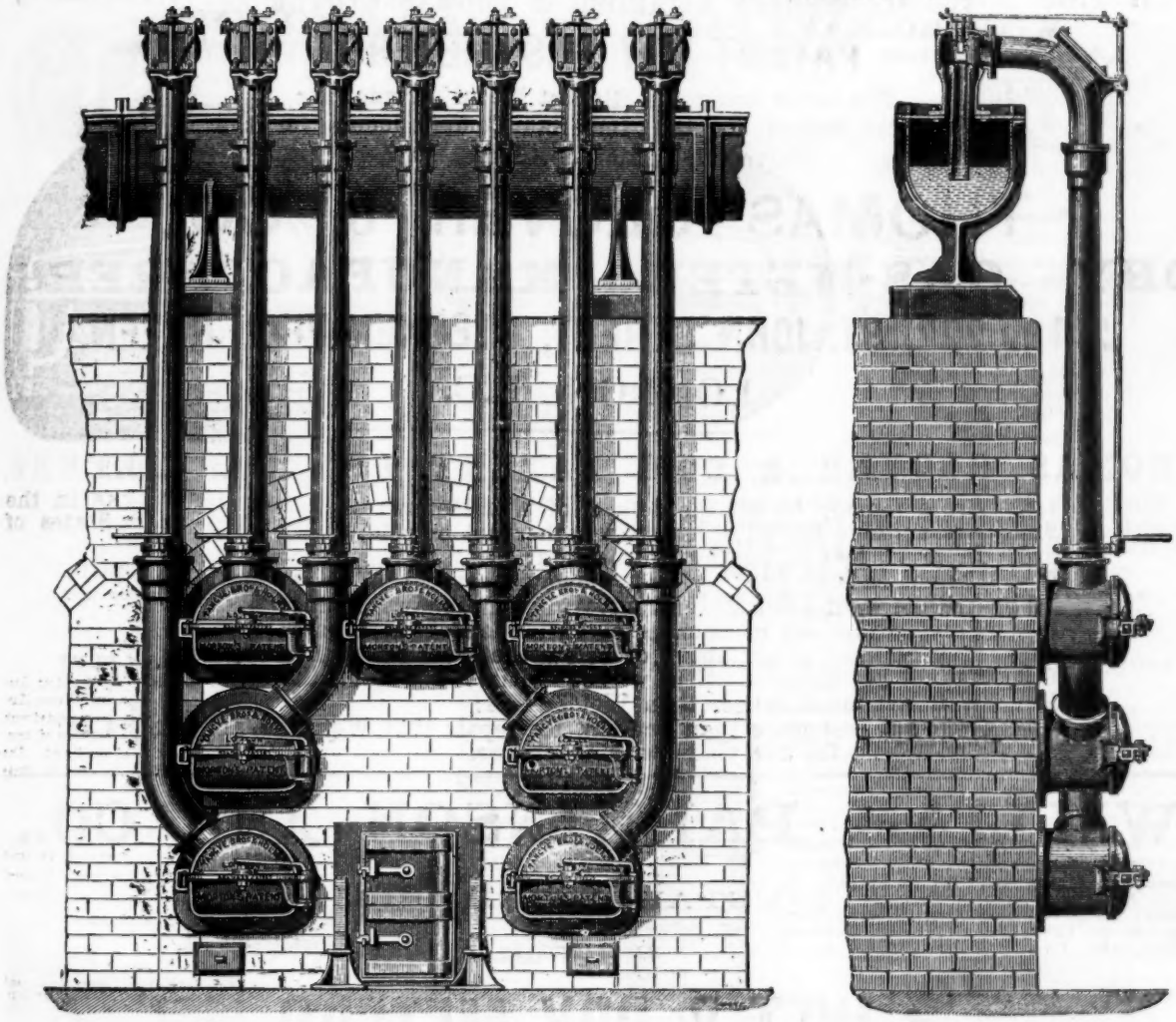
CORNISH, LANCASHIRE, "THE KESTERTON," VERTICAL, AND MULTITUBULAR STEAM-BOILERS OF SUPERIOR QUALITY ALWAYS IN STOCK.

This Department having been greatly extended and furnished with the most approved Boiler-making Machinery and Tools, T. B. & H. are prepared to supply all kinds of Steam-Boilers with great facility at lowest current prices.

Also Makers of IMPROVED HYDRAULIC HOISTS, TRAVELLERS, CRABS, CRANES, PULLEY BLOCKS, HYDRAULIC AND SCREW LIFTING JACKS, LATHES, PUNCHING AND SHEARING MACHINES, And all other Descriptions of Tools, &c.

FULL PARTICULARS, ESTIMATES, CATALOGUES, &c., ON APPLICATION.

HOLMAN'S PATENT
NON-PRESSURE VALVULAR SEAL-PIPES
FOR
HYDRAULIC MAINS.



The salient features of the above arrangement are as follows:—

1. The Seal is instantaneously opened and closed from the stage by the stokers.
2. There are only two positions for the actuating lever: one when the Seal is opened during the period of carbonization, the other when it is closed for drawing and charging the retort.
3. The retort can never be blocked, because the port directing the gas *through* the Seal is always opened, and the port permitting the gas to *pass* the Seal *direct* into the hydraulic main is also open while the retort is at work.
4. The manager and stokers can always see at a glance, by the position of the lever, whether the retort is duly unsealed while carbonizing its charge.
5. There are no extraneous seals, stuffing-boxes, hinges, screws, chains, pulleys, springs, teeth, or other complication belonging to the valves; they are made plain and strong for rough use, and will last many years without renewal.
6. The valve faces are always covered and never separated, hence no foreign matter can put them out of action.
7. They are positive, reliable, interchangeable, free from all the uncertainty of automatic arrangements, and low in price.
8. No extra pipes or connections are required, because the Valvular Seal-pipe is self-contained in the single branch of the ascension-pipe, which stands on the hydraulic main, and is easily accessible by removing an ordinary cover secured by two bolts only.

(238) TWO HUNDRED AND THIRTY-EIGHT HOLMAN'S PATENT VALVULAR SEAL-PIPES are being fitted to the Hydraulic Mains at the Radford Station of the Corporation Gas-Works at Nottingham.

(84) EIGHTY-FOUR more are being fitted to the Mains in the New Retort-House of the Gas-Works at Brentford, and they can be readily applied to existing Hydraulic Mains generally.

They are to be fitted to the Hydraulic Mains of the New Retort-House at the LONDON GAS-WORKS, and at other large stations.

Mr. MORTON writes in the following terms, under date of Feb. 3, 1880:—

"Gentlemen,—I have determined to use your HOLMAN'S PATENT NON-PRESSURE VALVULAR SEAL-PIPES in our new Retort-House. Will you, in the meantime, send me, as soon as you can, four as you are now making them. I expect to hear of a large demand for these Pipes. I like the idea of always maintaining a passage through an ordinary dip."

ESTIMATES for Retort Work, including Mouthpieces fitted with Morton's Patent Self-Sealing Lids and Holman's Self-Sustaining Cross-Bars and Fastenings, Hydraulic Mains and Ascension-Pipes, fitted with Holman's Patent Non-Pressure Valvular Seal-Pipes complete (as per accompanying illustration), will be forwarded to Engineers on receipt of particulars of intended erections, or re-setting of Retorts during the current or ensuing season.

Engineers preparing Specifications will be furnished with Tracings and all necessary data on application.

Sole Makers:

TANGYE BROTHERS AND HOLMAN,
HYDRAULIC AND GAS ENGINEERS,
CORNWALL HOUSE, QUEEN VICTORIA STREET, LONDON, E.C.

London, 1851. New York. 1853. Paris, 1855. London, 1862.

Dublin, 1865. Paris, 1867.

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters bv the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

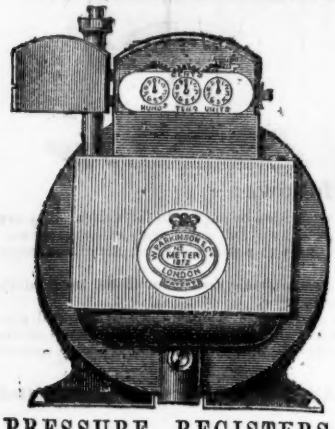
214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

LONDON, E.C.

THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS.

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

WILLIAM PARKINSON AND CO.,



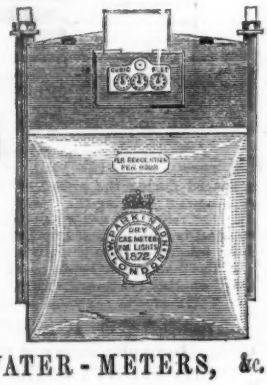
(ESTABLISHED 1816,)

MANUFACTURERS OF

WET & DRY METERS,

STATION-METERS & GOVERNORS,

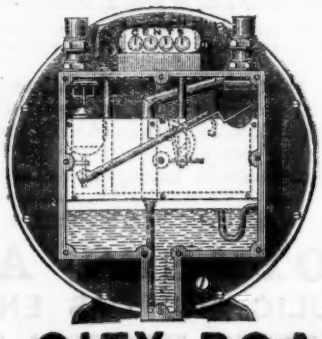
EXHAUSTER REGULATORS,



PRESSURE REGISTERS, EXPERIMENTAL APPARATUS, GAUGES, WATER-METERS, &c.

HUNT'S PATENT IMPROVED COMPENSATING METER.

In this Meter, the action of the measuring-drum is reversed. By this arrangement an improvement is effected in the registration at high speeds, which, in many tests, has not varied from the smallest light to three times the capacity of the meter. It works equally well under all pressures. The range of error between the high and low line is much smaller than that allowed by the "Sale of Gas Act."



The Meter has been critically tested, and most favourably reported upon by official Meter Inspectors in London and Birmingham.

W. PARKINSON and CO. have made arrangements for the manufacture of these Meters, both in tin and cast-iron cases, and for the alteration of old ones to this principle, which is confidently recommended as possessing every quality that can be desired by Gas Companies, Corporations, or Private Consumers.

COTTAGE LANE, CITY ROAD, LONDON, E.C.

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, FEBRUARY 17, 1880.

Circular to Gas Companies.

We can only repeat what we said last week, that we have as yet no information as to any further progress made with the scheme for the amalgamation of the Phœnix and South Metropolitan Gas Companies. It is quite understood that, the Companies having complied with every requirement of the Board of Trade, and no objection being sustained by any Local Authority, the scheme will be sanctioned, and, as a matter of course, passed without further question. Why it hangs fire we are utterly at a loss to conjecture. We cannot suppose that the permanent officials of the Board are neglectful of the obvious duty of sending forward for confirmation by the Privy Council, at the earliest possible opportunity, a document of so much importance. Much at the present time depends on the position which the project occupies. There are, for example, two Bills which await, it may be said, the completion of the amalgamation scheme. One Bill, that of the South Metropolitan Company, has passed the Examiners of Standing Orders, and will, of course, go forward; but the consideration of the Bill of the Phœnix Company by the Examiners has been twice postponed—for what reason we are not informed. The Bill is somewhat complicated, but that does not concern the Examiners, who have simply to decide whether certain formalities have or have not been complied with. We may assume that the Parliamentary Agent of the Phœnix Company is sufficiently acquainted with the requirements of Standing Orders, that nothing on his part has been neglected to ensure success. It must therefore be guessed that the Company are waiting in expectation of the confirmation of the amalgamation scheme, which will save them the necessity of proceeding with their Bill. It will obviously not be needed, if the South Metropolitan Company persevere and succeed with their measure. All necessary powers, except that required for the purchase of land and the raising of further capital, are to be found in the present Acts of the Company, and the variations proposed in the Phœnix Bill would prove of doubtful utility. We feel satisfied that the initial price of 3s. 9d. per thousand feet with the sliding scale would not be granted, although, under the circumstances, we cannot consider it too high, if the Phœnix Company were left to stand alone; but on this point we need not speculate. The name of the Phœnix Company—we say it without any disrespect—is, we hope, destined to become historical; while a better future awaits both the Shareholders of the Company and the consumers in their district. It cannot be disguised that the South Metropolitan Company are assuming a grave responsibility; but we have not the smallest doubt of the ultimate result. Increased prosperity and augmented dividends are, we believe, certain to follow from a combination so desirable.

The meeting of the Shareholders of the Chartered Company, reported in another column, it will be seen, passed off, if not quite harmoniously, yet with very little to disturb the serenity of the Board of Directors. The Governor's lucid statement of the affairs of the Company seemed to satisfy everybody except Sir Mordaunt Wells, whose objections, however, to the management of this great undertaking were easily answered. But we are somewhat anticipating. In our last we gave a tolerably full *résumé* of the accounts of the Company, and have but few additional items to refer to. One is that of £329 for experiments in improved public lighting. This, what we might almost call Quixotic attempt on the part of the Company to induce the Vestries to improve the illumination of our streets, has, we need hardly say, signally failed, as all attempts of the kind have previously done. Increased illumination means, of course, increased cost, and the vestryman, seeing that this means increased rates, at once sets his face against the proposed improvement. Nothing could have been more successful than the experiments made by the Phœnix Company in the Waterloo Road, and by the Chartered in Waterloo Place; but the money was, so to speak, thrown away. The Vestries, in fact, are now all intent on the electric light, which they expect will prove the ruin of Gas Companies and the salvation of ratepayers. It is a foolish notion; still it has entered the heads of a number of innocent men, and will not be dislodged. Some of the speakers at the Chartered meeting disabused the public of any idea that the electric light could, under any possible circumstances, enter into competition with gas. We hope that they were successful; but recent fluctuations in prices show that some adverse influence is occasionally affecting the price of gas property. The general stability in the price of gas stock, however, is a proof that nothing is disturbing the value of perhaps the most substantial investment to be found.

But to return to the Chartered Company's meeting. Sir Mordaunt Wells objected to the reduction of price recently announced, which was obviously due to the consumers, while being made in the direct interest of the Company. The effect of the reduction made at the commencement of this year will not be seen till after next June. The reduction of twopence per thousand feet is a very serious matter with the Chartered Company. It means, the Governor tells us, a decrease of no less than £100,000 in their annual income. Increased consumption in consequence of a lower price will, however, we have no doubt, soon make up for the deficiency, and indeed add to revenue. With regard to the dividend, we may express a hope that the Directors will proceed cautiously. At the present selling price of gas—3s. 4d. per thousand feet—the Directors may, at the end of this half year, pay eleven and a quarter per cent.; but we quite agree with some of the Shareholders that it would be far better to add to the reserve-fund than pay an enhanced dividend. There is every indication that coal will increase in price, and, let us say what we may, the price of coal must, after all, govern the profits of gas manufacture. It would be well, then, for the Directors to provide what we may call a nest-egg of ample size for future contingencies. Perhaps the Shareholder who recommended

the appropriation of £500,000 to the fund was not so far wrong. The estimate was high, but, after all, the amount cannot be considered excessive.

As a matter of course, the electric light attracted some attention, but happily not much. We shall deprecate all allusions to this invention as a competitor with gas, until we have something tangible to deal with. The Jablochkoff system is, as we know, a reality; but Mr. Edison's crudities are little more than myths, which even his own countrymen hold up to scorn. It was certainly not worth the trouble of any Shareholder in the Chartered Company to refer to the matter. It may, however, be mentioned that the Metropolitan Board of Works have extended their contract with the Société Générale d'Electricité for another two months, at the expiration of which time we suppose we may expect a report, as to the cost, &c., of the light, by the Board's Engineer and Chemist.

As already mentioned, the meeting of the Chartered Company was of a very satisfactory character; the complaints as to the cost of management being easily satisfied. As a matter of fact, we believe that the Directors of Gas Companies do more actual work than falls to the lot of any Board of Railway Directors, who have highly-paid officials to whom they entrust the management, while they themselves meet for the transaction of business perhaps once a month only. The Directors of Gas Companies meet weekly, and in the interim have committee work to attend to, which occupies them another day or two. We are certain, then, that no reasonable Shareholder would begrudge the remuneration allotted to the Directors. Altogether, the management of the Chartered Company is everything that can be desired, and none but an unusually exacting Proprietor can have any cause to grumble.

To our great astonishment, the Corporation of the City of London are persevering with their Bill to effect alterations, which have been described in our columns, in the Acts of the Chartered, the Commercial, and the South Metropolitan Gas Companies. It is a perfectly gratuitous business, for only a small portion of the Chartered Company's district lies within the limits of the Corporation, while those of the two other Companies proposed to be affected lie entirely beyond their control. Perhaps before these lines reach the reader's eye the whole thing will have fallen through. The Bill stood for second reading last evening, and Colonel Makins was to move its rejection. We have a strong suspicion that the Bill would find but few friends in the House, and that, strong as the Corporation of London are in parliamentary influence, the measure would receive but little support. It is a significant fact that the Metropolitan Board of Works decline to join the Corporation in the attempt they have made to alter recent gas legislation. As a matter of course, the Companies interested will, if necessary, strenuously oppose the measure in all its stages; but we cannot think that any opposition will be necessary.

[Since the above was in type, we learn that the consideration of the motion for the second reading of the Bill in the House was adjourned from yesterday till this afternoon.]

The report of the Directors and the accounts of the Barnet District Gas and Water Company have been issued in anticipation of the half-yearly meeting to be held on the 27th inst. The circumstances of the Company are rapidly improving. In the past half year the increased receipts for gas amount to £392 12s. 8d., and for water to £333 9s. 10d., which is a considerable advance upon the corresponding half of the previous year. The balance of receipts over expenditure is £3827 9s., which allows of the payment of a dividend of five per cent. per annum, free of income-tax. We might complain that the report is meagre, giving us really no information as to the condition of the works; but we shall say nothing about this, hoping for details at the coming meeting.

We have now the gas accounts of the Corporation of Birmingham before us, and find that the consumption of gas in the borough goes on developing. Up to the present time the out-districts share in making that increase, and this is of some importance, as soon several of them will drop off, and then Birmingham proper will be left almost to itself. There is, however, sufficient evidence to show that a rapid increase of consumption will continue to be maintained. During the past year the increase in the gas sold has amounted to 150 million feet, or about six per cent., which proves that the Gas Committee are not in at all too great a hurry in undertaking the extensive additions to their Windsor Street works. The total income of the undertaking from all sources amounted to £464,064. Against this has to be placed the total expenditure of £321,803, which leaves a gross profit amounting to £142,261. From this has to be deducted interest on loans, and the payment of annuities, after which there remains a balance of £51,165, which is to be allocated as follows:—£25,000 is to be handed over to the borough improvement rate, and the remainder carried to the sinking-fund to pay off the purchase-money. It is success like this which tempts Corporations and other Local Authorities to covet gas undertakings, and to obtain them wherever they can; but it must be admitted that all Corporations have not had the good fortune which has attended that of Birmingham. It is due to the energy and skill of all concerned in the management of the undertaking that the results which we have detailed above have been obtained. The Committee labour with a will, and the Engineers and Managers bring to their work an amount of skill which is beyond all praise.

The Jarrow works of the South Shields Gas Company are so advanced that the Directors, on Monday in last week, invited a large party of Corporate Officials and Shareholders to inspect them. There are special features in these works which merit attention. They were fully described to the assembled visitors by Mr. W. J. Warner, the Engineer, and on a future occasion we shall give a further account of them. It is sufficient now to say that nearly every operation is effected by the aid of machinery designed by Mr. Warner, and constructed under his supervision; manual labour being, to a great extent, dispensed with—all, in fact, but what is necessary to work the machinery, some of which is of so simple a character that it can be managed by a child. As stated above, we hope, in a future number, to give a full account, with illustrations, of Mr. Warner's inventions. On Thursday next another party of Engineers and others will visit the works; so that doubtless we shall have further details to publish in a subsequent issue.

The gas consumers of Tring bring grave complaints against the local Gas Company, both as to the quality of the gas and the price at which it is supplied. The Company are non-statutory, and apparently not over successful, for although they charge 5s. 10d. per thousand cubic feet for gas, they only divide seven and a half per cent., though it is true that some small extensions have been made out of profits. The protest of the consumers at a public meeting recently held was of a mild and respectful character, and we hope the Directors will take it into their serious consideration. There are some people in the town who think that the price of gas should be at once reduced to 4s. 6d. per thousand feet, while others, more reasonable, would be content to see it brought down to 5s. 3d. In all cases of this kind it should be borne in mind that Directors and Managers of Gas Companies know their own business best; but perhaps matters at Tring are susceptible of some improvement.

There is also an agitation at Gloucester, to obtain a reduction in the price of gas and the abolition of meter-rents. The Company there have a grievance, which perhaps justifies them in keeping up the price for the present. They were compelled by the Corporation to remove their works and erect new ones at an expense of £40,000—an outlay which, we believe, has not yet proved remunerative. The reduction in price asked for is not large, but if the Company cannot afford to make it, there is, so far, an end to the matter. With regard to the abolition of meter-rents, they constitute an important addition to the income of the Company; still, we agree with a correspondent, whose communication we publish in another column, that it might be well to discontinue them wherever circumstances allowed. Consumers in general regard the rate as a vexatious charge, and think that a Company ought not to make a profit out of the instrument which measures the article they retail. We should, however, be glad to hear the opinions of our readers as to the policy or impolicy of charging meter-rents.

Sale of Shares in the Kingston-on-Thames Gas Company.—On Tuesday last, Mr. Nightingale sold by auction ten £50 shares in the above-named Company, who are at present paying 10 per cent. per annum dividend; also three other £50 shares, the dividends on which are limited to 7½ per cent. per annum. The 10 per cent. shares were all quickly sold for £1065, the prices of the shares varying from £102 to £108 each, or an average of just £106 10s. For the three 7½ per cent. shares, £82, £82, and £84 were made. The total amount of the sale was £1313.

Yesterday's Prices of Gas and Water Shares.—Mr. A. G. Prater, Stock and Share Broker, of 23, Cornhill, gives the following as the closing prices yesterday of some of the principal gas and water shares:—

Gas Companies.		*Water Companies.*	
Commercial	180 —183	Chelsea	207 —212
Continental Union	19 — 20	East London	210 —213
Crystal Palace District	170 —175	Grand Junction	117 —120
European	17 — 18	Kent	288 —293
Gaslight and Coke "A"	180 —182	Lambeth	207 —210
Imperial Continental	176 —178	Southwark & Vauxhall	213 —217
London	175 —180	Do. "D"	173 —173
Phœnix	35½— 36½	West Middlesex	183 —188
South Metropolitan	195 —200		
Do. "B"	178 —183		

Water and Sanitary Notes.

Mr. Fawcett has in vain endeavoured to elicit from the Government the date at which the public Bill that is to authorize the purchase of the Metropolitan water undertakings is to be introduced to the House of Commons. In the face of the announcement made by the Home Secretary, that the intentions of the Government would be disclosed in the course of a week or ten days, the inquiry of Mr. Fawcett must be regarded as a little impertinent. The Government may be safely trusted to make known their intentions when they have any to make known. So far as we can see at the present time, Mr. Cross and his advisers are in a fog. Nothing can be easier than to calculate the value of dividends which are payable; but when this has been done the entire valuation of the Metropolitan water undertakings has not been completed. For instance, we are now told that the valuers estimate of the Companies works will not be concluded until the middle of June next; but, in the interval, it will be perfectly competent for the Government to arrange terms for the purchase of the dividends, and also to constitute a Trust for the future management of the undertakings. The sum which will be required for the purchase has been variously estimated at widely different amounts; but as we shall soon have Mr. Cross's statement, we do not think it worth while to quote mere guesses which have been made as to the total. It is now admitted on all hands that prospective profits must be paid for—some say up to the maximum dividends, which will make the price very high. It would, however, be nothing more than simple justice, for we may take it as certain that every one of the Metropolitan Water Companies would, if left alone, at no distant date pay maximum rates. We have to remain for some time longer in doubt as to the course the Government will pursue; but, in the meantime, it is evident from the prices now obtained for shares in the Companies, that nothing like the confiscation which was hinted at by the Home Secretary last August is feared.

As we predicted, the Metropolitan Vestries are anxious to be represented on any Trust or Commission which may be created for the management of the Metropolitan water undertakings. We are not quite certain of the position taken up by the Chelsea Vestry; but if they petition to be represented, on the ground that the local rates are to be made liable for deficiencies in water revenue, we cannot but think that they have reason on their side. A mere Government commission must not be trusted to tax the Metropolitan ratepayer, should they fail in making a profit out of the water supply.

The Bill of the Southwark and Vauxhall Water Company has passed the Examiners of Standing Orders, and will now, we hope, go forward. We confess to some strong sympathy with the promoters of the measure, who have done what should have been done long since—viz., made an attempt to effect the amalgamation of all the Metropolitan Water Companies. Some few years ago but little opposition would probably have been made to the proposal, and it may be that should the Government fail in achieving their professed object, difficulties will only arise in one particular quarter. The New River Company we feel assured will refuse to take any secondary position; but they might be left out of the combination, without any disadvantage to the scheme. Supposing the Bill to be carried, we would suggest the commencement by amalgamating the three Companies south of the Thames. Several advantages would ensue from such a combination. The works all united, a scarcity of water would be hardly possible; but it is useless to speculate. Metropolitan water affairs are in such a position that it is difficult to guess what may or may not happen.

It would seem that a deficiency of water is already threatened in various parts of the country. The Liverpool Corporation are just now in alarm, for their stock of water decreases every week, and no rain comes to fill up the gradually exhausted reservoirs. The stock of water in the Rivington reservoirs is lower now than it has ever been since the dry season of 1868. At Bristol, too, a very deficient rainfall is noticed, which, if continued, must produce serious inconvenience. To Liverpool a deficiency in the water supply would be a most important matter. The vast population depending upon the Corporation for a supply would suffer greatly if it should be necessary to impose restrictions on the employment of the water. By great care and diligence, Mr. G. F. Deacon, the Borough Water Engineer, has succeeded in reducing the consumption to 22·80 gallons per head of the population; but even this decreased quantity must be considered to involve great waste. Sixteen gallons per head per day is quite sufficient for any population; and even when Liverpool obtains, as we hope it will, the additional supply from the Vyrnwy, we trust that continued efforts will be made to keep down waste.

We always expected that considerable opposition would be made to the Vyrnwy scheme of the Corporation of Liverpool. It is natural that the various towns and cities lying in the Valley of the Severn, and who draw their supply of water from that river, should take alarm at the prospect of seeing abstracted some of the best water which flows into it. The Vyrnwy water is, we believe, admitted to be the purest which finds its way into the Severn, and accordingly opposition to the Liverpool water scheme comes from such towns and places as Tewkesbury, Shrewsbury, Worcester, Gloucester, Cheltenham, and others, which are indebted more or less to the Severn for their water. An influential deputation from the above-mentioned places waited on the President of the Local Government Board last week, to urge that the Government should interfere to prevent Liverpool from going for a water supply to a watershed which did not geographically and naturally belong to it. It was represented that other sources were available, which would leave the Severn unaffected. There were, for example, the sources of the Dee, about the appropriation of which much was said some years ago. Then the deputation expressed an opinion that Liverpool might share with Manchester in the advantages of the Thirlmere scheme; and, if neither proposal suited, there was the possibility of obtaining an independent supply from another of the Cumberland Lakes—say Haweswater. From Mr. Sclater-Booth's reply to the deputation, it seems certain that Government interference in the matter is not to be expected. The Bill of the Corporation of Liverpool must go through the constitutional process of being referred to, and reported upon by a Parliamentary Committee, before whom the opponents of the measure may bring their several allegations. Will, for example, the commerce of the Severn be at all interfered with, if the scheme of the Liverpool Corporation be carried out? Will the salmon fisheries be at all affected? And, lastly, how far is it likely that the water supply of the towns down the river will be either circumscribed or damaged if the Vyrnwy waters be stopped out? All these questions will be thoroughly discussed before a Committee, who will, in the end, decide for or against the scheme. The contest will be a long and, we fear, expensive one. The comparatively small towns along the Severn have to fight a rich and powerful Corporation, who will call to their assistance all that money can purchase in the way of learning and talent—legal, engineering, and chemical.

The Local Government Board have, as a matter of course, ordered an inquiry to be made before they sanction the Provisional Order applied for by the Lower Thames Valley Main Sewerage Board. The object of the Board is to obtain power to take land compulsorily, on which to utilize the sewage of the joint district. The Local Boards interested now appear to offer much opposition. Teddington, which endeavoured to escape from the combination, is held fast by the fiat of the Local Government Board, who refused to allow them to go. Now they resolve to oppose the scheme of the Joint Board, but grumble dreadfully at the expense in which they will probably be landed. East Molesey also opposes, and the Corporation of Kingston are loud in their opposition. Altogether, things do not look promising for the issuing of the Order. We strongly suspect that even without the opposition of landowners and occupiers of villas, &c., which must be anticipated, the scheme of the Joint Board will collapse. It is expected that the inquiry will be opened in about a fortnight's time, and may last a week or two; so there will be ample opportunity for engineers and lawyers to reap a fair harvest.

Widnes Local Board Gas and Water Supply.—At the meeting of the Widnes Local Board, last Tuesday, a report was presented by the Engineer (Mr. J. Roberts), which stated that the total amount of water pumped during 1879 was 492,956,894 gallons; during 1878, 484,028,451 gallons; showing an increase of 1·80 per cent. for 1879. The total rainfall for the year 1879 was 29·16 inches, against 33·71 for 1878. The total quantity of gas made during 1879 was 71,075,000 cubic feet; during 1878, 70,175,000 feet; or an increase of 1·28 per cent. for 1879. The average illuminating power of the gas for the past month was 17·14 candles; and for the whole of 1879, 17·2 candles.

The Gas Supply of Rawmarsh.—At the monthly meeting of the Rawmarsh Local Board, on Wednesday last, the Clerk stated that he had received the award made by Messrs. George Wilson Stevenson and George Livesey, who were appointed on behalf of the Rotherham Corporation and the Rawmarsh Local Board, to arbitrate with regard to the value of the gas-mains belonging to the Rotherham Corporation, in the district of the Local Board, which are to be transferred to the Board under the powers of the Rawmarsh Gas Act, 1879. The Arbitrators fixed the sum to be paid by the Local Board for the purchase from the Corporation of all mains, pipes, apparatus, and other things in connection with the supply of gas referred to, at £3236 14s. 5d., each party to pay their own costs, and one-half of the costs of the award, which amounted to £127. On the motion of Mr. Jackson, seconded by Mr. Goodinson, it was resolved that the transfer of the mains from the Corporation be completed.

BOARD OF TRADE REPORT ON THE GAS AND WATER BILLS AND PROVISIONAL ORDERS FOR THE SESSION OF 1880.

The "Report of the Board of Trade upon all the Railway, Canal, Tramway, Gas, and Water Bills of Session 1880," was presented to the House of Commons on the 5th inst. From it, it appears that the number of Bills this session of which the Board take cognizance amounts to 172, against 194 in the session of 1879. The total amount of money proposed to be raised is £31,042,900, against £29,967,386, or an increase in the session of 1880, as compared with the session of 1879, of £1,075,514.

The number of Bills which relate to the supply of gas is 27. There is no Scotch Bill, and only one Irish—Cork. It should be stated that of these 27, in 3 there are included provisions relating to the supply of water. The capital asked for amounts to £4,416,250 —viz., £2,831,000 by shares, and £1,585,250 by loan. There are, in addition to the 3 above mentioned, 20 Water Bills—15 English, 1 Scotch, and 4 Irish. The capital asked for by these Bills is £5,084,900, the greater part (£4,240,200) by loans, only £844,700 being proposed to be raised by shares.

The Provisional Orders deposited with the Board, under the provisions of the Gas and Water Works Facilities Act, include 7 in reference to gas, and 8 to water supply. The capital proposed is—for gas, £117,500 by shares, and £46,000 by loans; and for water, £185,000 and £43,750, respectively.

Of the 47 Bills, 24 relate to the supply of gas only (if we except those which contain provisions also for the use of the electric light) and 3—Lancaster Corporation, Oldham Improvement, and Wigan Improvement Bills—to the supply of both gas and water; 8 being proposed by corporations or local boards, 2 by new companies, and 17 by existing companies. The remaining 20 Bills, which are solely in reference to water supply, are promoted—14 by corporations and local boards, 2 by new companies, and 4 by existing companies.

An analysis of the Bills and Orders is appended to the report, showing, for the Gas Bills, the object of each Bill, the capital proposed to be raised by shares and loans, the special rate of dividend (if any), the proposed standard of illuminating power, and the proposed maximum price per 1000 cubic feet; and for the Water Bills, the object of each Bill, and the capital proposed. A grouping list is also added, dividing the Bills into those promoted for the North and South of England, Scotland and Ireland.

Communicated Article.

THE THEORY OF DISSOCIATION.

By Mr. H. B. Dixon, M.A.,
Millard Lecturer on Chemistry at Balliol and Trinity Colleges, Oxford.

By Dissociation is meant the breaking up of a compound body, by an increase of temperature, into two or more simpler bodies, which, as the temperature is allowed to fall, recombine to reproduce the original compound. The term was introduced into chemical science by Henri St. Claire Deville. In 1857 he wrote to the French Academy:—

> When heat acts on any matter it produces a dilatation, which is attributed to a force that has been named *the repulsive force of heat*. By choosing suitable matter for the experiment, and raising the temperature sufficiently, the distance between the molecules can be increased to such a degree that they separate, and pass into the elementary state. There is a spontaneous decomposition, in the sense that no chemical phenomenon intervenes to determine it. This I have proposed to call the "dissociation of compound bodies."

The experiment of Grove on the decomposition of water by a white-hot platinum wire was the starting point of Deville's classic researches on this subject. He began by repeating Grove's experiment on a large scale. He melted a quantity of platinum in the oxy-hydrogen flame, and poured the mass into water. The molten metal produced an abundant disengagement of an explosive gas, consisting of hydrogen and oxygen, together with a small quantity of nitrogen previously held in solution by the water. The water is partially decomposed by the heat of the platinum into its constituent elements. The temperature produced by the chemical union of oxygen and hydrogen to form water is sufficiently high to melt platinum. The white-hot wire used by Grove cannot have so high a temperature as the oxyhydrogen flame, and cannot, therefore, when placed into water, raise its temperature to a degree higher than that produced by its formation from oxygen and hydrogen. How is it that water is decomposed at a temperature certainly not higher than the temperature at which it is formed? Such is the paradox which St. Claire Deville set himself to explain. He found that many compound substances are partially decomposed by heat at a temperature considerably below that required for their complete decomposition into their constituents, just as liquids begin to volatilize at a temperature below that of their fixed boiling points. Not only is water partially decomposed at the temperature of the oxyhydrogen flame, but even at the melting point of silver, about 1000° centigrade. When silver is melted in an atmosphere of steam, it dissolves a considerable quantity of oxygen, and the equivalent quantity of hydrogen is found in the free state when the vessel cools. This decomposition, Deville shows, cannot be attributed to the *chemical* affinity of the silver for oxygen, for oxide of silver gives up its oxygen at the temperature of melted silver. The silver acts as a filter to separate the oxygen from a mechanical mixture of hydrogen and oxygen. By passing steam rapidly through a white-hot platinum tube, Deville failed to obtain any permanent gas, owing to the complete reunion of the dissociated oxygen and hydrogen on cooling. By taking advantage of the superior *diffusive* power of hydrogen over oxygen, Deville succeeded in separating hydrogen from heated steam in the following way:—A tube of porous earthenware was enclosed in a larger tube of glazed porcelain; through the inner porous tube a current of steam was passed; and in the annular space outside it a current of carbonic acid. The gases which escaped from the tubes were collected in separate vessels over a concentrated solution of potash, by which the carbonic acid was completely absorbed. The porcelain tube was placed in a charcoal furnace, and heated to about 1200° C. From the inner porous tube an explosive mixture of oxygen, hydrogen, and nitrogen was obtained in one receiver; from the outer tube an explosive mixture of oxygen, hydrogen, carbonic oxide, and nitrogen was obtained in the other receiver. The steam is partially dissociated into oxygen and hydrogen in the porous tube; and since hydrogen diffuses through a porous diaphragm four times as fast as oxygen, the outer tube receives continually, by diffusion from the inner tube, a supply of gas in which the proportion of hydrogen to oxygen is greater than that in which these gases unite to form steam. The inner tube, which contains oxygen in excess above that required to form steam with the remaining hydrogen, also receives by diffusion from the outer tube a supply of carbonic acid. In the outer tube the carbonic acid and free hydrogen undergo a chemical reaction, whereby steam and carbonic oxide are produced—

$$CO_2 + H_2 = CO + H_2O.$$

This reaction is limited owing to the reverse action of steam on carbonic oxide to re-form carbonic acid and hydrogen. In the outer tube there will thus be carbonic acid and steam, and, in small proportions, free hydrogen, free carbonic oxide, and free oxygen. In the inner tube the same gases will be present in different proportions. When the gases in the two tubes cool, the oxygen and hydrogen present combine in fixed proportion to form steam, leaving in the inner tube an excess of oxygen, in the outer an excess of hydrogen. A certain portion, therefore, of whatever carbonic oxide is present in the outer tube escapes oxidation on cooling; while whatever carbonic oxide is present in the inner tube is oxidized to carbonic acid by the excess of oxygen. The small quantity of nitrogen found in the receiver was due to a small admixture of air in the carbonic acid and steam, and to the passage through the white-hot porcelain of some nitrogen from the furnace.

In a second experiment, Deville passed nitrogen through the outer tube, and found free hydrogen in the outer, and free oxygen in the inner tube, on passing a current of steam through the inner porous tube at a white heat.

Instead of submitting the dissociated gases to diffusion, Deville found that he could prevent complete recombination of oxygen and hydrogen by mixing them with a sufficiently large volume of an inert gas, such as carbonic acid or nitrogen. A glazed porcelain tube was filled with fragments of porcelain, and heated to whiteness in a furnace; through the tube a current of carbonic acid was passed, together with steam. The gases coming from the heated tube were collected over potash, by which the undecomposed carbonic acid was absorbed. An explosive mixture, consisting of oxygen, hydrogen, carbonic oxide, and nitrogen, in the following proportions, was gradually collected:—

	(1)	(2)
Oxygen	46·1	46·8
Hydrogen	35·4	31·9
Carbonic oxide	12·0	10·7
Nitrogen	6·5	10·6
	100·0	100·0

In this case the complete recombination of the oxygen and hydrogen is prevented by their great dilution with carbonic acid. The cooling is sufficiently rapid to reduce the temperature of the mixture below the point at which oxygen and hydrogen unite before all the scattered molecules can find their mates in the crowd.

In a later experiment, Deville passed pure carbonic acid alone through a porcelain tube filled with fragments, and heated to whiteness. The issuing gas was not completely absorbed by potash, but a small quantity of an explosive mixture of carbonic oxide and oxygen was collected, the complete reunion of the two gases being prevented by the large volume of inert carbonic acid with which they were mixed during the time they were cooling and were within the limits of temperature between which the gases exhibit a chemical affinity one for the other.

In the above-described experiments on the dissociation of gases, the actual amount of decomposition proved to have taken place is exceedingly small. Deville endeavoured to determine the amount of dissociation undergone by a given weight of steam at a temperature of 1100° C. by taking its vapour density in a porcelain vessel. In decomposing into oxygen and hydrogen, steam increases in bulk by half its volume, and consequently becomes lighter. An accurate determination of its density should thus afford the information required. The density of steam determined at this high temperature showed no sign of any diminution. The amount of steam dissociated must accordingly be inconsiderable. This experiment of Deville had an important bearing on the controversy which was first raised in 1862 on the condition of gaseous compounds at a high temperature—a controversy which has lasted till the present day, and the progress of which, as it has exerted a great influence on our ideas of matter in the gaseous state, I propose to briefly chronicle in the pages of the Journal.

Wishing to obtain more exact measurements of the decomposition effected by rise of temperature, Deville experimented with compounds which are non-volatile at ordinary temperatures, but which give off a gas when strongly heated. He found that when certain salts, of which one of the constituents was volatile, were heated in a closed tube, they suffered partial decomposition, the amount of which varied

with the temperature. The volatile constituent, filling the tube, acquired an increasing tension as the decomposition progressed, until at a given temperature an equilibrium was established between the tension of the gas and the tendency of the compound to break up; such that on raising the temperature further decomposition of the salt occurred, and on lowering the temperature a recombination of the separated constituents took place. Whether with a falling or rising thermometer, the amount of decomposition was a function of the temperature. At any particular temperature the tendency of the salt to break up was prevented by a sufficient accumulation of the volatile constituent round it. When powdered chalk is heated in an iron tube, exhausted of air by means of a pump, no decomposition takes place until the temperature reaches dull redness. Then, as the temperature is raised, the vacuum in the tube is gradually impaired, showing that the chalk is undergoing decomposition. At the temperature of boiling cadmium (about 800° C.), the tension of the gas in the tube reaches 85 mm. of mercury (3¼ inches). Decomposition then ceases. The tendency of the carbonic acid to leave the lime is balanced by the pressure of the atmosphere of carbonic acid in the tube. On placing the iron tube into the vapour of boiling zinc (somewhat over 1000° C.), more carbonic acid is given off by the chalk until its tension reaches 520 mm. (20½ inches) of mercury, when the decomposition is again arrested. If the pump is now worked, and some of the carbonic acid carried out of the tube, decomposition sets in until the equilibrium is restored by a fresh supply of carbonic acid to the atmosphere of the tube. On allowing the tube and contents to cool, the carbonic acid is re-absorbed by the lime, and when the ordinary temperature is reached the vacuum is completely restored. If the temperature being kept constant, the pressure of the gas in the tube is increased by mechanical means, such as lessening the space above the chalk, equilibrium is re-established by an equivalent absorption of the carbonic acid by the lime, so that, *cæteris paribus*, the amount of decomposition of a given weight of chalk depends on the size of the vessel in which it is heated.

The same partial decomposition occurs in the case of many hydrated salts. When heated in an exhausted sealed tube connected with a pressure-gauge, they give up their water till the tension of the steam reaches a certain degree, which is constant for a given temperature. On raising the temperature more steam is given out by the salt, and on lowering the temperature the steam is re-absorbed.

(*To be continued.*)

Correspondence.

[*We do not hold ourselves responsible for the opinions expressed by Correspondents.*]

METER-RENTS.

Sir,—I have found, from experience, that one drawback to the more general use of gas by small consumers, for domestic purposes, is the charge for meter-rent. Supposing a company in the financial position to abolish this charge, what argument can be used in favour of its retention? I believe some companies have discontinued charging for meters, and I should be glad if you or any of your readers can give me some data on the subject. A tradesman does not charge separately for the use of his weights or measures. Why should a gas company do so?

A Provincial Secretary.

THE ALLEGED DESTRUCTION OF LEATHER BOOKBINDINGS BY GAS.

Sir,—With reference to the article on "The Alleged Destruction of Leather Bookbindings by Gas," given in the last issue of your Journal, I send with this a reprint of a paper read before the Library Association at Oxford in 1878, by which you will see that the destruction of the binding of the books in the Literary and Scientific Institution of Bath by sulphuric acid was found to take place equally in the rooms that were not lighted by gas and in those rooms that were. Consequently, so far as this instance is concerned, no case has been made out as against gas, and the mischief would appear to be due to the use of sulphuric acid in the manufacture of certain kinds of leather, notably calf.

Bath, Feb. 14, 1880. Charles Ekin, F.C.S.

The paper referred to was one by the Librarian of the Royal Literary and Scientific Institution, Bath (Mr. C. P. Russell), in which he says: Upon many of the volumes in the library of the Bath Royal Institution, especially upon those bound in calf, I have observed a white deposit, which, upon being applied to the tongue, I found to be of a sharp acid flavour. The thin basil labels, to my great annoyance, constantly became loose, and dropped from the backs of the books without being touched. I found that under these loosened labels there was a larger accumulation of the same white powder. Hoping to find a remedy for this state of things, I collected some of the powder, and sent it to Mr. Ekin, an Analytical Chemist in Bath, who kindly undertook to examine it. His report is as follows:—

"*Analytical Laboratory*, 8, *Argyle Street, Bath, Sept.* 25, 1878.

"Dear Mr. Russell,—I have examined at your request a dirty-looking crystalline powder taken from under the labels of books bound in calf, and one of the labels themselves—these books not having been exposed to the action of gas. Also a similar-looking powder from under the labels of books in the reading-room, where gas is burnt.

"The powders consist of sulphate of ammonia, with a large proportion of free sulphuric acid. The washings from the label give a very acid reaction to test-paper, and also contain sulphuric acid.

"There can be no doubt that it is the uncombined sulphuric acid that is occasioning the damage to your bindings, but inasmuch as books that to your knowledge have not been exposed to the action of gas for many years are equally affected with books that have been kept in rooms where gas is burnt, and moreover as it is only certain materials, such as calf, that are affected in this way, it does not appear that a very clear case has been made out against gas. It may be that the books were exposed to the products of the combustion of gas before they came under your supervision, although it is hardly likely in that case that the action of the acid would not have shown itself sooner. It is possible that sulphuric acid is used to dress calf and the other materials that are affected, and gradually brings about decomposition. The whole subject is worthy of further investigation.—Yours truly,

"Charles Ekin, F.C.S."

As the larger accumulation of the acid is under the label, and not on its surface, I am disposed to think with Mr. Ekin that the dressing of the leather has much to do with it.*

THE GAS REFEREES SULPHUR TEST.

Sir,—With the experience of more than 16,000 tests made by the Referees Sulphur Test, I beg to be permitted to say that I have never had such an accident as Mr. Greville described in last week's Journal. I may, however, say that similar appearances have always been observed when the burner has been "alight underneath." I find that the lost experiments average under ½ per cent., and are chiefly due to stoppage of the gas supply in the services, the rubber connections breaking, and the burners lighting underneath; but I have never yet lost a test from liquor running down the tubulure and trumpet tube, except when the burner has been alight underneath.

When working the sulphur test according to the Gas Referees plan, I have found the amounts of liquor vary very much according to the temperature of the outside air. In very cold weather I have had over 12 ounces, and in warm rooms as little as 6½ ounces.

To any one interested in this matter I would suggest two simple experiments which will perhaps give some information on the influences of varying quantities of liquor upon the results. Instead of giving the eduction pipe a fall into the cylinder, let it incline the other way, so that its outlet is a little below the top of the cylinder, and place a beaker so as to catch the liquor condensing in the eduction pipe. Test this liquor separately from that and the washings of the other parts of the apparatus. Also leave off the eduction pipe altogether, so as only to obtain about ½-oz. liquor in the bottom of the cylinder; and find whether the results are the same as in a sulphur apparatus with the eduction pipe. These two experiments will show the value of the eduction pipe and the liquor condensed by it. I satisfied myself on this point four or five years ago.

The secret of good sulphur results I believe to be good ventilation. I could say much on this point, but will be contented with stating that most of the very low sulphur results—say under 6 grains per 100 cubic feet—that have come under my notice (not explainable by leakage) have been due to bad ventilation. The large quantity of liquor condensed by Wright's Sulphur Test with the Liebig condenser, and the low sulphur results this test gave, will be in the recollection of many of your readers.

Any experiences others may be able to give will be appreciated by

Feb. 11, 1880. Another F.C.S.

The Recent Fire at the Dublin Theatre Royal.—We regret to learn that this melancholy occurrence was attended by two accidents to persons in whom we are specially interested. Mr. Thomas Cotton, Assistant Secretary and Superintendent of the Alliance Gas Company, on hearing of the fire, proceeded immediately to the theatre with the view of securing the gas-meters. He made his way to the stage and ascertained that the gasman had previously turned off the gas from all the meters. The smoke was, however, so suffocating that Mr. Cotton was dragged out of the blazing building in a state of exhaustion. In order to prevent the chance of an explosion, he gave directions at once to have the street-valves in Poolbeg Street turned off; and while engaged in this service Mr. John Waterfield, son of the Gas Company's Engineer, sustained a fracture of the leg by the fall of a portion of the wall of the theatre. The latest accounts state that Mr. Waterfield is progressing favourably.

The Malton Gas Company's Bill.—On Thursday, the 5th inst., a meeting of owners and ratepayers of Malton was held for the purpose of considering whether the town should support the Local Board in their opposition to the Bill now being promoted in Parliament by the local Gas Company. The Chairman of the Board (Mr. H. Hurtley) presided, and after having explained the portions of the Bill which the Board think inimical to the interests of the ratepayers, submitted a resolution consenting to the Board's opposition to the Bill. On being put to the meeting, the resolution was passed by a large majority; whereupon a poll was demanded, and this will be taken in a few days. On the following Saturday a public meeting was held on the subject, when the accompanying resolution was carried unanimously:—"That this meeting approves of the action of the Local Board in opposing the Bill set down to be passed through Parliament by the Gas Company, and pledges itself to support them to the utmost of their power; also to advocate the purchase, as soon as possible, at a fair and reasonable price, of the gas-works, so that the ratepayers can have the advantage of being their own gas producers."

Kildwick Parish Gas Company.—The ordinary half-yearly meeting of this Company was held on Tuesday, the 3rd inst., when the report presented by the Directors stated that the total receipts on capital account, including £18,544, the proceeds of £9 10s. per share paid up on 1952 shares of £10 each, first issue, and £9956, the proceeds of £9 10s. per share paid up on 1048 shares of £10 each, second issue, were £28,798 6s. 4d. The disbursements, which included £2919 12s. 10d. for land and law charges, £14,744 16s. 4½d. for new buildings, works, apparatus, &c. (of which sum £333 15s. 11d. was expended during last half year), £7666 18s. 2d. for new mains and service-pipes, and £2364 1s. 5d. for law and parliamentary charges, amounted to £27,879 13s. 5½d., thus leaving a debit balance of £918 12s. 10½d. The revenue account showed receipts from sale of gas and meter-rents, £64 19s. 4d.; sale of residual products, £124 5s. 11d.; sundries, £9 19s. 9d. —total, £777 5s. The payments were for the manufacture of gas, £336 7s. 10d.; management, wages, rates, and taxes, £70 19s. 5d.; leaving a balance in favour of the Company of £369 17s. 9d. The net amount of profits available for the half year was £365 18s. 10d., which represented a steady increase on previous returns. The Directors recommended the balance to be disposed of as follows:—To pay a dividend of 1½ per cent., free of income-tax, which will require the sum of £356 3s. 7d., leaving a balance of £9 15s. 3d. to be carried to the contingent-fund, which, with a previous amount of £184 13s. 9½d. brought forward, will now stand at £194 9s.

* I find upon reference to the article on "Tanning" in the *Encyclopædia Britannica*, that sulphuric acid was formerly largely used in many of the processes employed for dressing the skins as there described. The hides were in some cases submitted to a scouring operation, and immersed for a certain time in a pit containing "*water strongly impregnated with vitriolic or sulphuric acid.*" This would be quite sufficient to account for the presence of the acid in the old leather bindings, and the decomposition caused by its action upon the leather.

Parliamentary Intelligence.

PRIVATE BILLS RELATING TO GAS, WATER, Etc.

Session 1880.

Progress made to Saturday, Feb. 14.

Title of Bill.		Petition for Bill Presented.	Bill Read the First Time.
Ackworth, Featherstone, Purston, and Sharlston Gas Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Birkenhead Borough Bill	Lords	..	..
	Commons	..	..
British Gaslight Company, Limited (Staffordshire Potteries), Bill	Lords	Feb. 10	Feb. 10
	Commons	..	..
Burton-upon-Trent Corporation Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Cardiff Water Bill	Lords	Feb. 10	Feb. 10
	Commons	..	..
Chester Gas Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Cork Gas Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Cork Improvement Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Dagenham and District Farmers (Optional) Sewage Utilization Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Dartford Gas Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Dearne Valley Water Bill	Lords	Feb. 10	Feb. 10
	Commons	..	..
Denton and Haughton Gas Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Doncaster Corporation Water Bill	Lords	Feb. 10	Feb. 10
	Commons	..	..
Eastbourne Gas Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Edinburgh and District Water Bill	Lords	Feb. 10	Feb. 10
	Commons	..	..
Exmouth and District Water Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Gaslight and Coke, Commercial Gas, and South Metropolitan Gaslight and Coke Companies Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Great Yarmouth Water Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Hinkley Local Board Gas Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Huddersfield Tramways and Improvement Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Hull Lighting Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Hyde Gas Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
King's Lynn Corporation Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Lancashire County Justices Bill	Lords	Feb. 10	Feb. 10
	Commons	..	..
Lancaster Corporation Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Lincoln Gas Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Liverpool Corporation Water Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Liverpool United Gas Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
London Gaslight Company Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Maidstone Gas Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Malton Gas Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Oldham Improvement Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Phœnix Gaslight and Coke Company Bill	Lords	..	..
	Commons	..	..
Portmadoc Water Bill	Lords	Feb. 10	Feb. 10
	Commons	..	..
Prescot Gas Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Preston Improvement Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Rathmines and Rathgar Township (Vartry Water Supply) Bill	Lords	..	..
	Commons	..	..
Rathmines and Rathgar Township Water Bill	Lords	Feb. 10	Feb. 10
	Commons	..	..
Reading Gas Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Rochester Corporation Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Sea Water Supply to London Bill	Lords	Feb. 10	Feb. 10
	Commons	..	..
Sligo Borough Water Bill	Lords	Feb. 10	Feb. 10
	Commons	..	..
South Metropolitan Gas Company Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Southwark and Vauxhall Water Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Stafford Borough Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Wakefield Corporation Water Bill	Lords	Feb. 10	Feb. 10
	Commons	..	..
Wandsworth and Putney Gas Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Wigan Improvement Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Wrexham Water Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10
Yeadon and Guiseley Gas Bill	Lords	..	..
	Commons	Feb. 9	Feb. 10

HOUSE OF COMMONS.

Thursday, Feb. 12.

THE GOVERNMENT AND THE METROPOLITAN WATER SUPPLY.

Mr. Fawcett had given notice to ask the Secretary of State for the Home Department if he could inform the House when the Bill relating to the Water Supply of London would be introduced.

Mr. Sclater-Booth, in the absence of Mr. Cross, replied to the question. He said: The Bill in question is in a forward state of preparation; but I am not at this moment in a position to say on what day it will probably be introduced.

Friday, Feb. 13.

THE RIVERS CONSERVANCY BILL.

Mr. Arthur Peel asked the President of the Local Government Board when he proposed to re-introduce the Rivers Conservancy Bill of last session.

Mr. Sclater-Booth said Her Majesty's Government were of opinion that it would not be expedient to introduce the Bill again during the present session.

THE GASLIGHT AND COKE, COMMERCIAL, AND SOUTH METROPOLITAN GAS COMPANIES BILL.

Colonel Makins gave notice in reference to this Bill, promoted by the Corporation of London, that on the motion for its second reading he will move—"That it be read a second time upon this day six months."

NATIONAL WATER SUPPLY.

Mr. Rowley Hill gave notice that he will this evening ask the President of the Local Government Board whether, in view of applications from various districts to take water for their own purposes from watersheds with which they have no natural connection, the Government are prepared, in anticipation of legislation upon the subject, to initiate an inquiry into the whole question of water supply.

Legal Intelligence.

BRADFORD WEST RIDING POLICE COURT.—Thursday, Feb. 12.

(Before Col. Pollard, *and a Bench of Magistrates.)*

ILLEGAL USE OF GAS.

Job Myers, a grocer and mason, of Idle, near Leeds, was charged by the Airedale Gas Company with having illegally used gas, by lighting, without their authority, one of the public lamps near to a building being erected by him.

Mr. Workman appeared to prosecute on behalf of the Company; and Mr. C. L. Atkinson defended.

Sergeant *Clay* stated that on Saturday, Jan. 24, he saw the defendant climb the lamp in question and light it. He had seen him do the same on two or three other occasions. On Jan. 31 the defendant saw witness at the police station, and told him that he had been unable to see the Manager of the Gas Company when he called upon him for the purpose of making an arrangement.

Mr. *Robert Senior*, Manager of the Gas Company, said the defendant never called upon him, and no authority had been given to him to light the lamp.

Colonel Pollard said the defendant had been previously before the Bench, who had had a great deal to do with him and his family. He had been warned before, and would be fined £5 and costs, with the alternative of two months imprisonment. He should make no further observation; the defendant had been told before that what he had done was a criminal act. It was a criminal act, and the defendant was a wrong-doer.

Miscellaneous News.

METROPOLIS GAS SUPPLY.

Metropolitan Board of Works.—It may be remembered that at a meeting of the Board on Friday, the 16th ult., a letter was presented from the Chelsea Vestry, asking the Board to take the necessary steps to procure, in the Bill to be promoted this session by the London Gaslight Company, clauses requiring the Company to supply gas of as high an illuminating power, and of as great purity, as that furnished by the Companies under the supervision of the Referees. The letter was referred to the Special Purposes and Sanitary Committee, who, at last week's meeting of the Board, presented a report recommending that the Vestry be informed of the decision come to by the Board on the subject at their meeting on the 6th inst., which was not to offer any objection to the principle of the Bill, but to present a petition asking that the Company's expenditure of capital for the purposes named in the Bill might be limited to £25,000. The recommendation of the Committee was agreed to.

Parish Parsimony in Street Lighting.—We have often noted the niggardliness of vestries in regard to public lighting, especially when desirous of showing a favourable statement of cost under the average meter system. A correspondent has forwarded us a copy of the *St. Pancras Gazette* for the 7th inst., which contains the following paragraph on the subject:—"Some time since we called attention to the deficiency in the gas lighting of the back streets; and several correspondents also complained. At first this was denied, but the facts were so plain that at last the defect, especially in Camden Square, was remedied by some re-adjustment. It appears that, with the winter and the very exceptional weather, the old story crops up. The other day, at the Vestry, Mr. Balfour complained of the early hour at which the lights were extinguished in his neighbourhood. Now a correspondent complains of the total darkness of Islip Street. The story is similar to the old one; the principal thoroughfares, where there is little chance of danger, are lighted first, while the back streets, and the turnings off Kentish Town Road especially, where the blindness of the streets and the little through-traffic invite robbery and assaults, are left in the dark. It is not so certain that the management of all these matters by the local authorities is the best for the public. The public now has no remedy, except publicity in the Press; the other way, there is an additional power on the side of the ratepayers, in the local government, which can use pressure upon the companies. Now, every driblet is saved, far beyond the legitimate line to which the gas companies would have been allowed to go; of course with a 'very great saving'—on paper."

Whitby Water Company.—The annual meeting of this Company was held on Tuesday, the 3rd inst., when the accounts presented showed a disposable balance of £1849 10s. 11d., and the Directors recommended that a dividend of 9½ per cent., or 19s. per share on the fully paid-up shares, and 9s. 6d. per share on the shares on which £5 is paid, be declared, free of income-tax. This payment, which was agreed to, will absorb £1665 16s. 6d., and leave a balance of £183 14s. 5d. to be carried to the credit of next half year's account.

SOUTHWARK AND VAUXHALL WATER COMPANY.

A Special General Meeting of this Company was held at the Offices, Sumner Street, Southwark, on Thursday last, to consider the Company's Bill now before Parliament—Alderman H. E. KNIGHT in the chair.

The SECRETARY (Mr. Alfred Jelley) read the notice convening the meeting, and the minutes of the last meeting, which were confirmed.

The CHAIRMAN then said: Gentlemen, as you are doubtless aware, this meeting is necessary, in order to carry out the requirements of the law, but after all it is really only a formal one. You are simply asked to consider a resolution approving of the Bill we have introduced into Parliament, and to give your sanction to it. The object of the Bill has already been placed before you on the notices we have sent out, so that you might avail yourselves of the opportunity of voting by proxy, if you could not attend. It is therefore not a matter that I need occupy your time in dwelling upon. Certain important questions might arise in connection with the negotiations going on with the Government with respect to the acquisition of our undertaking; but I shall ask you to have confidence in your Directors, and believe that they will do the best they can for you. If any of you were selling your own business, you would not lay your private thoughts before the general public. I believe myself that the Directors are pursuing a course which is most consistent with your interests and the very valuable property they hold in charge for you. I shall therefore move—"That this meeting, having considered the Bill introduced into Parliament in the present session, intituled 'A Bill for empowering the Southwark and Vauxhall Water Company to construct additional works and to raise additional capital and for other purposes,' approves thereof, with or without any modifications which Parliament may require or permit, and which the Directors shall approve."

Mr. VIALLS seconded the motion.

The CHAIRMAN: The Solicitor is present, and he will now give you an outline of the Bill.

The SOLICITOR (Mr. S. Bircham) read the heads of the Bill, stating that its objects were disclosed in the preamble, which was of a formal character, reciting the Acts of the Company, and the present state of their share and loan capital, and the necessity, with a view to the requirements of the district which was supplied, that further powers with respect to the purchase of land and the construction of works should be authorized. There were certain dealings suggested as to surplus lands. The first four clauses of the Bill were entirely formal. The 5th clause described the works proposed to be executed. They consisted of a pumping-station, reservoirs at Hampton, a boundary or river wall, and certain aqueducts in connection with those reservoirs, and the necessary conduits from them to the existing pipes of the Company. The fourth heading of the 5th clause was with respect to the Whitgift reservoir, at Croydon. The 6th clause limited the deviation of the works; the 7th, the period for the purchase of land; and the 8th, for the completion of the works. The 9th clause was with respect to taking by agreement lands not exceeding in the whole 50 acres. The 10th clause referred to easements, and the 11th, 12th, and 13th clauses to leases. The 14th clause empowered the Company to sell certain lands not required for the purposes of their undertaking, and the 15th clause was as to the receipts, or the purchase-money for that land. The 16th clause had reference to the additional capital proposed to be raised; and the 17th, 18th, 19th, 20th, 21st, and 22nd clauses also had relation to the capital, and were technical clauses. The 23rd clause gave powers to borrow in respect of the money proposed to be raised by the Bill, subject to certain conditions required by it. Clauses 24 to 30 inclusive related to debentures, and were also technical. The 31st clause related to the application of the authorized funds, limiting them to the purposes of the Act; the 32nd had reference to the supply of water in bulk; the 33rd and 34th related to convenient restrictions as to domestic supply; the 35th had reference to agreements that might be entered into between the Lambeth Company and this Company as to the supply of certain districts. That was permissive only. Clauses 36 to 41 related to powers sought for amalgamation among the various London Water Companies, and were permissive clauses only; and the 42nd clause related to the expenses of the Act, and was technical.

Mr. BRADFIELD said the amount of capital the Company were asking for powers to raise had not been stated.

The CHAIRMAN said £650,000 was mentioned in the Bill.

Mr. BRADFIELD: And the debentures?

The SOLICITOR: £163,000.

Mr. CLENDON wished to know whether, if Mr. Cross was going to purchase the undertakings of the Water Companies, it was advisable to proceed with a Bill which Parliament might throw out.

The CHAIRMAN: That is a natural question, and one which has been anxiously debated by the Directors, but it was necessary for the purposes of your undertaking, to enable you to perform your duties properly, that we should go to Parliament for powers to construct additional works. This was decided upon before we heard anything about the Government buying us up. We do not know even now whether the Government will take us over. Nothing is settled, and we felt that in your interests we were right in placing ourselves in this position—that if the Government do not buy us we may go on and increase our business and earn more dividend. If, however, the Government do take us, we are in no worse position by this Bill.

Mr. BRADFIELD said that from the public Press they learnt that the Government had settled with the Companies generally, though Parliament had not sanctioned the arrangement. He did not know whether that was correct or not.

The CHAIRMAN: The negotiations have fallen on my shoulders, and they have been of a very heavy character, and have caused me much anxiety. So far as we have gone at present, nothing absolute is settled; but we have met on both sides with the desire to do our duty to ourselves and to the public; and I am in great hopes that a satisfactory result to the public and to all parties concerned may be arrived at.

Mr. BRADFIELD asked if it was intended to issue any new shares or debentures.

The CHAIRMAN: We have not issued any new shares or debentures, and in face of the negotiations going on with the Government we should desire to act in the most honourable and straightforward manner, and we do not like to lay ourselves open to the suspicion that we have issued shares without necessity. We shall therefore not do so unless there is a thoroughly tangible reason.

Mr. SHERARD thought it would have been better for each of the Shareholders to have received a copy of the Bill.

The CHAIRMAN: It is not usual to send a copy of the Bill to all the Shareholders. The Shareholders appoint Directors, and they have confidence in them as regards these matters of detail. As to the amalgamation clauses, we have thought it wise to introduce clauses in our Bill permitting us, by agreement with the other Companies, to amalgamate with them.

Mr. SHERARD asked whether the Companies had agreed to this, because, if not, he thought they would have nothing but litigation and expense. This was not the first time the Government had taken them in hand. They had had a splendid offer, and he thought it would be very unwise to go to Parliament in the face of it.

Mr. FRENCH said the Directors advised the Company to go to Parliament and spend a large sum of money for which they would not have any return. Mr. Cross had said that he would pay on the dividend, not on the Companies outlay.

A SHAREHOLDER said the recommendations of the Directors were for the general interest.

Mr. FRENCH said the matter had been forced upon the Shareholders, and this should not have been done. He would therefore move as an amendment—"That in face of the Government measure to buy up the whole of the Companies, and it being well understood that an arrangement has been come to, it would be unwise and prejudicial, in the best interest of the Shareholders, on the ground of the great unnecessary expenditure, to proceed with the proposed Bill of the Company."

Mr. SHERARD seconded the amendment, which was put and lost.

The CHAIRMAN then put the original motion, which he declared carried, with one dissentient, and the proceedings terminated.

THE GASLIGHT AND COKE COMPANY.

The Half-Yearly General Meeting of this Company was held on Friday last—the Hon. RICHARD HOWE BROWNE, the Governor, in the chair.

The SECRETARY (Mr. J. Orwell Phillips) read the notice convening the meeting, and affixed the seal of the Company to the register of Proprietors. He also read the minutes of the last meeting, which were approved as correct by the present meeting, and signed by the Governor.

The following report of the Directors was taken as read:—

The Directors place herewith before the Proprietors accounts of their working during the latter half of the year 1879, which show that, with very slight exception, the prosperous advance of the Company has not been retarded.

The winter of 1878-9, which was one of low temperature, was marked by a very large increase in the consumption of gas in the Company's district, and, indeed, throughout the country; and the repetition, at an unusually early period, after a cold and wet summer and autumn, of weather of great severity, accompanied by a prevalence of fog and darkness almost unprecedented, has caused that increase to be renewed and maintained in the present winter.

The Directors have more than once had occasion to allude to the difficulties experienced in their sale of coke, and they regret that they are unable to report that those difficulties have been entirely overcome. The result, however, of their manufacture of other residual products fully justifies the expenditure of capital in providing for it.

The Company's stations and plant are, as usual, being maintained in the highest state of efficiency, and are receiving renovation and continual extension to meet the fast-growing demands for gas, which the Directors believe will be accelerated by a reduction in price to 3s. 4d. per 1000 cubic feet announced from the commencement of this year. For these purposes it is, of course, necessary that frequent additions should be made to the Company's called-up capital, and the Directors having, as stated in their last report, offered new stock for sale by public auction, were induced to test the alternative mode of raising capital enjoined by their Act of 1876, and have recently submitted a further sum of £100,000 of ordinary stock for competition by public tender, at the reserve price of £176 for every £100 to be issued. The Directors are happy to report that, at and above that price, they received applications for nearly twice the amount of stock which they had to allot.

A Bill affecting this Company has been introduced into Parliament by the Corporation of London, unsupported, however, by the Metropolitan Board of Works. Under such circumstances, it appears hardly probable that the Bill will be prosecuted. Should it, however, be proceeded with, the Directors will be prepared to act as the interests of the Company appear to dictate.

The Directors have only to add that, all preferential charges being met, and maximum dividends on the B and H stocks being provided for, they recommend out of the surplus profits a dividend on the ordinary stock of the Company at the rate of 10½ per cent. per annum.

No. 1.—STATEMENT OF STOCK AND SHARE CAPITAL, *on Dec.* 31, 1879.

Acts of Parliament relating to the raising of Capital.	Description of Capital.	Standard Dividend.	Number of Shares issued.	Nominal Amount of Shares.	Called up per Share.	Total paid up.	Arrears of Calls.	Remaining to be called up and unissued.	Total Amount authorized.
The Gaslight and Coke Company's Act, 1868	A Ordinary stock	10 per cent.	..	..	..	£1,540,790	..	..	£
	A Preference convertible stock, 1st issue	5 ,,	..	..	..	1,760	..	..	1,550,000
	Ditto, 2nd issue	Ditto.	..	..	..	1,800	..	..	
	A Preference convertible shares, 3rd issue	Ditto.	565	£10	£10	5,650	..	..	
The Gaslight and Coke Company's Act, 1872	Ditto, 4th issue	Ditto.	50,000	10	10	500,000	..	..	1,000,000
	Ditto, 5th issue	Ditto.	50,000	10	10	500,000	..	..	
The Victoria Docks Gas Act, 1857	A Ordinary stock	10 per cent.	..	..	..	100,000	..	..	100,000
The City of London Gas Company's Act, 1859	A ,, ,,	Ditto.	..	..	..	300,000	..	..	400 000
	B Stock	4 per cent.	..	..	..	100,000	..	..	
The Companies Act, 1862, as applied to the Western Gaslight Company, Limited	A Ordinary stock	10 ,,	..	..	..	600,000	..	..	600,000
The Imperial Gas Act, 1854	A ,, ,,	Ditto.	..	..	..	1,560,000	..	..	1,560,000
The Great Central Gas Consumers Act, 1851	C Preference stock	Ditto.	..	..	..	200,000	..	..	200,000
The Equitable Gaslight Company's Act, 1842	D ,, ,,	Ditto.	..	..	..	300,000	..	..	300,000
The Independent Gaslight and Coke Co.'s Act, 1864	E ,, ,,	Ditto.	..	..	..	165,000	..	..	255,000
	F ,, ,,	5 per cent.	..	..	..	30,000	..	..	
	G ,, ,,	7½ ,,	..	..	..	60,000	..	..	
The Imperial Gas Act, 1866	H Stock	7 ,,	..	..	..	325,000	..	..	325,000
The Imperial Gas Act, 1869	Ditto	Ditto.	..	..	..	975,000	..	..	975,000
The Gaslight and Coke Company Act, 1876	A Ordinary stock	10 per cent.	..	..	..	107,745	..	£92,255 800,000	1,000,000
						£7,372,745	..	£892,255	£8,265,000

No. 2.—STATEMENT OF LOAN CAPITAL.

Acts of Parliament authorizing the Loan Capital.	Total Amount authorized.	Description of Loan.	Rates per Cent. of Interest. 4 per Cent.	4½ per Cent.	4½ per Cent.	10 per Cent.	Total Amount borrowed.	Remaining to be borrowed.
The Gaslight and Coke Company's Act, 1868	£462,500	Debentures.	£67,000	£50,000	£329,850	..	£1,643,510	£17,990
The City of London Gas Company's Act, 1859	60,000	Debenture stock.	751,310	50,000	265,350	..		
The Great Central Gas Consumers Act, 1851	66,000	Bonds for capitalized profits.	..	..	..	£130,000		
The Victoria Docks Gas Act, 1857	25,000							
The Companies Act, 1862, as applied to the Western Gaslight Company, Limited	200,000							
The Imperial Gas Act, 1854	173,000							
The Imperial Gas Act, 1866	81,250							
The Imperial Gas Act, 1869	243,750							
The Gaslight and Coke Company's Act, 1872	250,000							
The Gaslight and Coke Company Act, 1876	100,000	..	..	..	..	..	..	900,000
	900,000							
	£2,561,500		£818,310	£100,000	£595,200	£130,000	£1,643,510	£917,990

No. 3.—CAPITAL ACCOUNT.

Dr. Cr.

	Expended this Half Year. £ s. d.	Total Expenditure to Dec. 31, 1879. £ s. d.		Receipts to June 30, 1879. £ s. d.	Received since that date. £ s. d.	Total Receipts to Dec. 31, 1879. £ s. d.
To Expenditure to June 30, 1879	..	8,366,633 12 11	By A Ordinary stock	4,100,640 0 0		4,208,535 0 0
Expenditure during half year to Dec. 31, 1879—viz.:			A 5 per cent. preference convertible stock	*1,870 0 0	107,745 0 0	1,760 0 0
Lands acquired, including law charges	16,838 3 4		A 5 per cent. preference convertible stock, 2nd issue	1,800 0 0		1,800 0 0
Buildings and machinery in extension of works	137,498 13 7		A 5 per cent. preference shares, 3rd issue	*5,690 0 0		5,650 0 0
New and additional mains and service-pipes	19,145 17 1		A 5 per cent. preference shares, 4th issue	500,000 0 0	..	500,000 0 0
New and additional meters	5,274 3 5		A 5 per cent. preference shares, 5th issue	500,000 0 0	..	500,000 0 0
Further expenses of issues of new capital	607 5 0		B 4 per cent. maximum stock	100,000 0 0	..	100,000 0 0
	179,364 2 5		C 10 per cent. preference stock	200,000 0 0	..	200,000 0 0
Cr.			D 10 ,, ,, ,,	300,000 0 0	..	300,000 0 0
By Sale of surplus land £828 9 7			E 10 ,, ,, ,,	165,000 0 0	..	165,000 0 0
Premium capital for expenses of issues of new capital 681 9 2	1,509 18 9		F 5 ,, ,, ,,	30,000 0 0	..	30,000 0 0
		177,854 3 8	G 7½ ,, ,, ,,	60,000 0 0	..	60,000 0 0
			H 7 per cent. maximum stock	1,300,000 0 0	..	1,300,000 0 0
			Debentures	466,850 0 0	†20,000 0 0	446,850 0 0
			Debenture stock, 4½ per cent.	265,350 0 0	..	265,350 0 0
			,, ,, 4½ ,,	50,000 0 0	..	50,000 0 0
			,, ,, 4 ,,	617,000 0 0	134,310 0 0	751,310 0 0
			Bonds for capitalized profits	130,000 0 0	..	130,000 0 0
		8,744,487 16 7		8,794,200 0 0	‡222,055 0 0	9,016,255 0 0
To Balance of capital account		352,283 4 9	Premium capital	..	80,516 1 4	80,516 1 4
				8,794,200 0 0	302,571 1 4	
		9,096,771 1 4				9,096,771 1 4

* £150 of these issues have been converted into ordinary stock during the half year. † Paid off. ‡ Net.

No. 4.—REVENUE ACCOUNT.

	£ s. d.	£ s. d.		£ s. d.	£ s. d.
To Manufacture of gas—			By Sale of gas—		
Coals, including dues, carriage, unloading, and trimming (see Account No. 9)	434,956 19 8		Common gas, per meter, at 3s. 6d. and 3s. 4d. per 1000 cubic feet	891,584 12 8	
Salaries of Engineers and other Officers at works	7,635 5 6		Cannel gas, per meter, at 4s. 4d. and 4s. 2d. per 1000 cubic feet	52,537 4 4	
Wages (carbonizing)	82,466 19 9		Public lighting and under contracts—		
Purification, including £14,035 3s. 11d. for labour	28,359 9 9		Common gas	62,061 18 8	
Repair and maintenance of works and plant, materials and labour; less received for old materials, £2835 13s. 9d.	153,330 3 3		Cannel gas (See Statement No. 11)	3,207 7 3	1,009,341 2 11
		726,748 17 11	Rental of meters	..	18,369 13 8
Distribution of gas—			Residual products—		
Salaries and wages of Officers (including Rental Clerks)	18,616 6 8		Coke, less £22,592 15s. 4d. for labour, &c.	119,849 19 4	
Repair, maintenance, and renewal of mains and service-pipes	36,019 11 6		Breeze, less £2151 18s. 3d. for ditto	1,587 3 6	
Repairs and renewals of meters	18,644 2 2		Tar, less £407 8s. 7d. for ditto	54,980 15 6	
		73,280 0 4	Tar products	34,615 6 1	
Public lamps—			Ammoniacal liquor, less £348 15s. 11d. for labour, &c.	54,733 16 2	
Lighting and repairing	11,577 15 3		Sulphate of ammonia	4,964 17 4	
Experimental street lighting	329 3 6				270,731 17 11
		11,906 18 9	Rents receivable	..	2,168 1 6
Rents, rates, and taxes—			Transfer fees	..	209 10 0
Rents payable	4,939 13 2		Canteen account	..	228 17
Rates and taxes	35,072 13 7				
		40,012 6 9			
Management—					
Directors allowance	3,750 0 0				
Company's Auditors	250 0 0				
Salaries of Secretary, Accountant, and Clerks	6,040 13 6				
Collectors commission	11,939 19 3				
Stationery and printing	3,181 1 8				
General charges	1,760 3 9				
		26,921 18 2			
Parliamentary charges	..	1,116 7 4			
Law charges	..	628 15 2			
Bad debts	..	5,543 16 6			
Depreciation-fund, for works on leasehold lands	..	750 0 0			
Superannuation allowances under amalgamation schemes, and annuities	..	8,337 1 10			
Public officers—					
Gas Referees and Official Auditor	933 7 5				
Public testing-stations	408 16 1				
		1,372 3 6			
		896,618 6 3			
Balance carried to net revenue account (No. 5)	..	404,420 16 9			
		1,301,049 3 0			1,301,049 3 0

No. 5.—NET REVENUE ACCOUNT.

	£ s. d.	£ s. d.		£ s. d.	£ s. d.
To Interest on debentures, debenture stocks, and bonds, accrued to Dec. 31, 1879	..	37,079 11 0	By Balance from last account	327,210 8 2	..
Dividend on A 5 per cent. pref. shares and stock	25,230 5 0		Less dividend on ordinary capital for the half year to June 30, 1879	215,283 12 0	111,926 16 2
Dividend on B stock, at 4 per cent.	2,000 0 0				
,, C ,, 10 ,,	10,000 0 0				
,, D ,, 10 ,,	15,000 0 0				
,, E ,, 10 ,,	8,250 0 0				
,, F ,, 5 ,,	750 0 0				
,, G ,, 7½ ,,	2,250 0 0				
,, H ,, 7 ,,	45,500 0 0		Revenue account (No. 4)	..	404,420 16 9
		108,980 5 0			
Interest on temporary loans	..	1,104 1 0			
Balance applicable to dividend on the ordinary stock	..	369,193 15 11			
		516,357 12 11			516,357 12 11

No. 6.—RESERVE-FUND ACCOUNT.

Balance, Dec. 31, 1879	£152,420 8 10	Balance, June 30, 1879	£150,079 5 10
		Interest on amount invested	2,341 3 0
	£152,420 8 10		£152,420 8 10

No. 7.—INSURANCE-FUND ACCOUNT.

Balance, Dec. 31, 1879	£76,588 7 4	Balance, June 30, 1879	£75,423 18 5
		Interest on amount invested	1,164 8 11
	£76,588 7 4		£76,588 7 4

No. 8.—DEPRECIATION-FUND ACCOUNT (FOR WORKS ON LEASEHOLD LANDS).

Balance, Dec. 31, 1879	£13,392 7 6	Balance, June 30, 1879	£12,449 11 4
		Amount brought from revenue account for the half year	750 0 0
		Interest on amount invested	192 16 2
	£13,392 7 6		£13,392 7 6

No. 9.—STATEMENT OF COALS USED, ETC.

Description of Coal.	In Store, June 30, 1879.	Received during Half Year.	Carbonized during Half Year.	Used during Half Year.	In Store, Dec. 31, 1879.
	Tons.	Tons.	Tons.	Tons.	Tons.
Common	66,641	612,696	552,045	563	126,729
Cannel	15,572	50,000	46,432	48	19,092

No. 10.—STATEMENT OF RESIDUAL PRODUCTS.

Description of Residual.	In Store, June 30, 1879.	Made during Half Year.	Used in Manufacture during Half Year.	Sold during Half Year.	In Store, Dec. 31, 1879.
Coke—chaldrons*	98,971	706,546	200,813	570,529	34,175
Breeze—chaldrons*	9,632	59,643	..	64,107	5,168
Tar—gallons	451,031	6,545,529	..	6,398,662	594,898
Ammoniacal liquor—butts of 108 gallons	15,575	178,898	..	173,371	21,102

* Under "Weights and Measures Act, 1878."

No. 11.—STATEMENT OF GAS MADE, SOLD, ETC.

Description of Gas.	Quantity Made (part measured).	Quantity Sold.			Quantity used on Works, &c.	Total Quantity accounted for.	Quantity not accounted for.	Number of Public Lamps.
		Public Lights and under Contracts (estimated).	Private Lights (per Meter).	Total Quantity Sold.				
	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	
Common	5,799,357	300,236	5,117,388	5,417,624	68,201	5,485,825	313,532	33,335
Cannel	281,866	11,791	243,305	255,096	1,934	257,030	24,836	2,230

GENERAL BALANCE-SHEET.

Dr.	£	s.	d.		£	s.	d.	Cr. £	s.	d.
To Capital—				By Cash at Bankers	..			120,002	17	8
Balance at credit thereof (Account No. 3)	352,283	4	9	Amount invested—						
Net revenue—				Reduced Three per Cent. Consols	152,420	8	10			
Balance at credit thereof (Account No. 5)	369,193	15	11	Three per Cent. Consols	76,588	7	4			
Reserve-fund account—				New Three per Cent. Consols	13,392	7	6			
Balance at credit thereof (Account No. 6)	152,420	8	10					242,401	3	8
Insurance-fund account—				Stores on hand, viz.—						
Balance at credit thereof (Account No. 7)	76,588	7	4	Coals	119,339	19	2			
Depreciation-fund account—				Coke	6,710	15	0			
Balance at credit thereof (Account No. 8)	13,392	7	6	Tar and ammoniacal liquor and products	124,978	4	1			
Debenture interest for amount due to Dec. 31, 1879	29,026	2	6	Sundry stores	123,031	3	10			
Bond interest for amount due to ditto	6,500	0	0					374,060	2	1
Preference dividends for amount due to ditto	108,980	5	0	Accounts due to the Company, viz.—						
Unclaimed dividends	5,754	18	7	Gas and meter rental—						
Sundry tradesmen and others, for amount due for coals, stores, and sundries	233,808	17	11	Quarter ending Dec. 31, 1879	719,999	1	2			
Benevolent-fund	1,606	18	5	Arrears outstanding	14,539	14	11			
Call account	54,734	17	0					734,536	16	1
Temporary loan	120,000	0	0	Coke and other residual products	43,111	3	6			
				Sundry accounts	662	1	2			
								43,773	4	8
				Retiring allowances	..			9,514	0	0
	1,524,290	3	9					1,524,290	3	9

The GOVERNOR: Ladies and gentlemen, I rise to propose the reception and adoption of the report, which you have been kind enough to take as read, together with the statement of accounts, which I hope you will agree with the Directors in thinking as of a very satisfactory nature. The increase in the rental from gas may appear to be rather small in comparison with what it has been of late years; but it must be taken into consideration that this increase, which is 3·67 per cent. upon the rental of the Company for the previous half year, is an increase upon a half year in which we enjoyed the benefit of 14 per cent. increase under very exceptional circumstances. It must, therefore, be considered as extremely satisfactory that we have not only been able to maintain so very large an increase in our rental, but that we are also enabled to add to it an increase of 3·67 per cent. The coal which we carbonized during the last half year was a very large quantity indeed—598,000 tons, and the increased quantity is, of course, accounted for, and most satisfactorily accounted for by the increase in gas we have sold during the period under review, and the profit is fully up to that which we have always calculated upon. Now, gentlemen, as to the condition of the Company. Speaking generally, the Court of Directors are enabled to state that it was never in a higher state of efficiency than it is at the present moment in all the branches of the manufacture, even in those new branches of manufacture we have so lately undertaken at Beckton. The utmost satisfaction is experienced every time we go round to visit our various stations. It is the practice for a certain number of the Directors periodically to visit every one of our stations, and to view for themselves, and to report upon the condition of each station. We find this is a most admirable system, and one which works extremely well. They go once or twice a month to each station, and the Chairman of the Committee makes a formal report to the Court, and the report is recorded among the archives of the Company. There is one unsatisfactory point to which I must refer, and that is the loss we have sustained in the sales of our coke. We always calculated that at Beckton we should lose a certain profit on the coke sales, and I think we reckoned on a loss of £3000 or £4000 a year; but there have been exceptional circumstances in the coke trade of the last year or two, which have worked very adversely to the interests of gas companies generally. In the first place, we have had some very wet seasons. Building has been almost at a standstill during the winter, in the frost, and this will account for a very large diminution in the sale of our coke. We are, however, I am happy to say, now in possession of contracts to an amount of something like 50,000 tons a year for export. Coke is an article which is very much appreciated in Holland and in some parts of France, and we are doing our utmost to send as much coke out of England as we can, so as to enhance the price of what remains. Gentlemen, since we last met we have raised £100,000 of capital by a new process. The first £100,000, you will remember, was raised under the auction clauses of our last Act of Parliament. It was offered to the public, and I believe if it had been a little better managed we might perhaps have realized a larger sum for the stock offered. At all events, we were not satisfied with the result of the sale, and we consequently determined upon trying the alternative method of raising capital by tender—to the public in the first instance, and afterwards to the Proprietors—at a certain minimum price. The result of our application to the public and to the Proprietors was small in the first instance, not amounting to anything like what we anticipated at the minimum price we put on the stock, but upon application to the Proprietors of the Company afterwards, I am happy to say that they had such confidence in their property as to induce them to apply for nearly twice as much capital as we had to dispose of. I think it is a most satisfactory point, that although the public, whom we take as not very friendly to us in a general point of view, did not appreciate the value of gas property, the Proprietors themselves put a just value on it, and took every shilling at the price we mentioned. Possibly it may be asked what capital we shall require in the future. I do not think we shall require more than £100,000 during the present year, and that not until the autumn—till July or August. We shall have sufficient capital in hand, what with the premium the stock realized, and which appears in the accounts for the first time this half year, and with the further amount of £100,000 I have just mentioned that we shall require this year, to enable us to carry on our extensive works, which are continually extending, and which must in a great concern like this be continually extending. With this amount of capital we shall have sufficient funds to carry us over the year. Gentlemen, since we last met there have been certain amalgamations on the southern side of the river. I cannot conceal my opinion that those Companies who have so amalgamated have taken a step in the right direction. They have consolidated their strength, and "union is strength;" and I dare say that when the whole amalgamations are carried out it will tend very much to the prosperity of the Companies concerned. They have my very best wishes that it should be so. There has been a Bill brought into Parliament, which stands for second reading next Monday, I believe; it has been brought in by the Corporation of London, and it is of a very oppressive and inquisitorial nature, as to this Company and two other Companies—the South Metropolitan and the Commercial Companies—who are under the same Acts as ourselves. Well, the Board of Directors have maturely considered the provisions of the Bill, and, acting in concord with the other Companies, have determined to oppose it as much as possible. Gentlemen, I should not object to the Corporation of London, or any other public body, finding fault with Gas Companies, or any other Companies who persistently and continuously defrauded the public, but in this case they have no cause whatever of complaint against us. In ninety-nine cases out of a hundred where they test, they find our gas perfectly up to the standard, both as to purity and illuminating power; and, therefore, it is a gratuitous onslaught on the funds of a public Company to compel us to go into Parliament, as we shall now be obliged to do, and oppose the Bill to the very utmost. The only good clause in the whole of the Bill—and I have read it very attentively once or twice—is the last clause, in which it is stated that "all costs, charges, and expenses preliminary to, and of and incidental to the preparing of, obtaining, and passing of this Act shall be paid by the Corporation out of their corporate funds." Now, gentlemen, I will give you a few figures to show how our manufacture has gone on. You see by the accounts the increase in our gas-rental and in our sales of products. I think that the last time I saw you the whole of the return from gas sold was about £1,000,000, and I congratulated you on that point as being the first time so large an amount had ever appeared in the accounts. Now, however, we come before you with receipts, reckoning them from all sources, amounting to £1,301,000, which I think must be very satisfactory; and in alluding to this I would just refer to one question, at which perhaps some disappointment may be experienced by some of the Proprietors. I may at previous meetings have given some indication that the accounts of the manufacture of residuals should be kept somewhat separate from the other accounts of the Company. We do so in a small degree—that is, as far as the products for this half year go; but I must beg of the Proprietors not to take the figures

appearing here as any indication whatever as to the ultimate result we expect from the manufactures. They are going on in the most satisfactory manner in every respect. We have an ample sale for everything we manufacture and have to dispose of. Our goods are all reckoned as "A 1," and command, in some instances, a higher price than any other stuff of a like nature that is sold in the market; but the Board consider it would be prejudicial to the interests of the Company, manufacturing, as we are, against other parties, to let those outside people too much into the secrets of our manufacture and the figures which come out. I hope, however, that the Proprietors have sufficient confidence in the Court to take it for granted as our opinion that everything in this way is going on not only most satisfactorily, but also most productively in the interests of the Company. The amount realized for coke per ton of coal is very bad—4s., against 4s. 9d. this time last year. The gross cost of the coal at all the stations is 15s. 2d., against 15s. 4d.—a small reduction; while the net cost of the coal per ton, deducting the proceeds from residuals, is 6s. 1d., as against 7s. 3d. Gentlemen, that will let you a little into the secret as to our manufacture of residual products, showing the increase in the receipts from those products when deducted from the net cost of the coal. Our bad debts amount to the very small sum of 0·54 per cent., which is really and truly nothing when compared with the magnitude of our operations, and must be taken as very satisfactory. The increase in the gas sold has been 3·67 per cent., and the price obtained for coke per measure of 48 bushels is 6s. 4d., as against 7s. 6d. The price of coke has been going down; but, as I said before, we hope very soon to recoup ourselves in a great measure from our export trade, which makes us a better return than we have been receiving in this country. A letter has been addressed to me by a Shareholder, who I am sorry is not able to ask his own questions. He refers to the necessity for gas companies finding some process by which to ventilate houses—not only houses which are built, but houses which are in course of building—from the products of the combustion of impure gas, and he asks us to offer a sum of money for a prize to any one who will invent such an apparatus. As far as the purification of gas goes, one of our cleverest and one of the most indefatigable men—Mr. Sugg—is at present occupied on that very subject; but as to our offering a prize for such a thing, I am afraid our Official Auditor (Mr. Parkes) would not countenance the charge of the sum against our accounts. Gentlemen, I do not think that I have anything further to trouble you with, and I will therefore only express a hope that you will consider our statement of affairs as satisfactory as your Court of Directors do, and I hope that we shall go on prospering to the end. I now beg to move—"That this meeting do agree with and confirm the report of the Directors, and the Auditors report, and the statement of accounts of the Company."

The Deputy-Governor (Mr. Edward Vaughan Richards, Q.C.) said he had much pleasure in seconding the motion. As the Governor had alluded to a Bill before Parliament, and as some of those present might perhaps be aware that this was somewhat in his special line, he might tell them that the Bill was promoted only by the Corporation of London, and that the Metropolitan Board of Works had declined to take any part in it. Nevertheless the Bill professed to affect not only the Chartered Company, but the South Metropolitan and the Commercial Companies, with which the City of London had not the slightest connection. Assuming, however, that all allusion to the South Metropolitan and Commercial Companies were struck out of the Bill, then it remained a fact that the City of London were seeking to re-introduce as to that portion of the Company's district with which they alone were concerned—about one-fifth of the whole district—those very discrepancies and anomalies as to gas legislation, which it had been the special effort of Parliament in the last ten years to rectify. Therefore he could not believe that the Corporation of London seriously contemplated proceeding with the Bill. If they did, the Directors would be fully prepared to fight them, and he thought they would fight them with success. However, he could not conceive that they would proceed with a Bill which was ridiculous in its proposed enactments, and perfectly unheard of, when it sought to regulate territory with which the Corporation of London had no sort of connection.

Mr. Darvill said he should like to make one or two remarks as to the electric light. He thought they ought to discuss the question, and give confidence to the Proprietors. When he saw that their shares were reduced 20 per cent. in consequence of false and unfounded statements originating in America, and which reached this country, purporting to come from "our own correspondents," and had the effect of depreciating gas property, he thought the Directors ought to try to give confidence to the Shareholders by assuring them that the gas companies stood as firmly as ever they did, and that the reports about the perfection of the electric light, although apparently endorsed by "our own correspondents," were intended to "bear" gas shares. Subsequently reports came that the previous reports were untrue, when the shares rose, and the people who were mixed up in the reports netted £40,000 or £50,000. It was simply a "ring." He only wished to draw attention to this fact, so that confidence might be imparted to the Proprietors, and that they might be warned against selling when in future they saw any such mendacious reports.

Sir Mordaunt L. Wells thought the best answer that could be given to the honourable Proprietor's remarks was this—that when the additional capital was required by the Company, the Shareholders themselves took it up; and he considered that this was a sufficient answer to the scare which had been caused with respect to gas property in England. If those who were most intimately acquainted with the working of the great Gas Companies of the Metropolis were willing to embark their capital in this Company and in other Companies, it showed that those who were best qualified to form an opinion with regard to gas property did not take any fright, or feeling of that kind, in respect to the agitation which had been going on in America and elsewhere. He was perfectly persuaded of this—that it would not be becoming on their part, or on the part of the Directors, to enter into any controversy whatever with respect to the question of the electric light. They had had enough of it for the present, and the best thing they could do was to turn their attention to the working of their own Company, and see how far they could, consistently with that which was due to the Shareholders of the Company, give to the public a pure and cheap light. This brought him to a point in the report which he should ask his brother Shareholders seriously to consider, as regarded the policy of the Directors in the course they had taken; he referred to the question of lowering the price of gas, and the dividend remaining in the same position as it did the previous half year. Most of them were aware that the lowering of the price had taken place under what was known as the sliding scale, which was introduced into their Act of Parliament some three or four years ago; and the principle of the sliding scale was that the public and the Shareholders were to share between them any additional profit which might be made beyond 10 per cent. The maximum price of the Company being 3s. 9d. per 1000 feet, they reduced the price of gas to 3s. 6d., and but for that the Directors would not have been empowered to pay the increased dividend, from 10 to 10½ per cent. But last half year they divided 10½ per cent., and there was a general rumour—such rumours did arise, as they all knew, in the City—that the Shareholders of the Company were to receive this half year 11 per cent. He heard this from one of the leading men in the City, who was formerly himself a gas director.

The Governor: We could not do so.

Sir Mordaunt Wells said he did not state that the remark was made with any authority on the part of the Directors, but he was sure that some of the Directors would bear him out when he said that such a rumour—most improperly, perhaps—was circulated. He did not for a single moment find fault with the Directors for the course they had taken as to the dividend, because he thought it would have been most prejudicial to the interests of the Company if they declared one farthing more than 10½ per cent. He, however, required an explanation of the motive of the Directors in lowering the price of gas, there being no corresponding benefit to the Shareholders, for in lowering the price they decreased to a certain extent the paying powers of the Company in reference to the dividend. No doubt the rumour he had referred to arose entirely from the circumstance of the Directors having lowered the price of gas. The Shareholders might have thought that under the sliding scale, when the price was lowered, it was with the object of giving them more dividend than they had received under the former price. [A Voice: The price was not to be lowered till the 1st of January.] He repeated that, according to the accounts, the price of their gas had been lowered.

The Governor: But the reduction does not affect these accounts at all.

Sir Mordaunt Wells begged to say that he was perfectly correct. If they referred to the revenue account they would see under "Sale of gas" the words "common gas, per meter, at 3s. 6d. and 3s. 4d. per 1000 feet," and this showed that in the sum received a portion was represented by the figure of 3s. 4d. He was, therefore, quite right.

The Deputy-Governor remarked that the speaker had found a mare's nest.

Sir Mordaunt Wells again referred to the entry he had drawn attention to in the revenue account.

The Governor: That figure only applies to a very small extent—the last ten days or so of the half year.

Sir Mordaunt Wells said that what he desired to point out was that the Governor had not stated any reason why they had lowered the price from 3s. 6d. to 3s. 4d., and he thought the Shareholders expected to hear from the Directors their reason for doing so. He held that it was of the utmost importance that they should know the motives of the Directors for lowering the price of gas, for unless they knew the reason for it, it was impossible for them to come to a conclusion whether it was right or wrong that the charge should be 3s. 4d. instead of 3s. 6d. He, however, would not dwell further on this point; but there was another subject as to which he wished to say a few words. He had a considerable amount of money invested in the Company, and he had the utmost confidence in the honour and integrity of the Directors. In their presence he spoke with the utmost respect, but at the same time with a feeling of independence in regard to his own position, when he said that he considered that the Company was one of the most expensively managed of the joint-stock companies in the Metropolis. He happened to be a shareholder in other companies, and he knew exactly how the directors were paid, and how the officials were paid in those companies. If there were any City gentlemen present he was sure they would do him the honour to pay some little attention to what he was about to state. The North-Eastern Railway Company was one of the largest concerns in the kingdom, their relations extending over the whole of the North of England. They had 19 Directors, men of eminence, public men, who, he knew, devoted a very considerable portion of their time to the affairs of the Company. The capital of the Company was enormous; and as to the whole working of the North-Eastern Railway system, every City man would bear him out in saying it involved, beyond all question, ten or even twenty times more work than any that the Directors of this Company could be called upon to do. ["No, no," from several Shareholders.] It was all very well for some gentlemen to say "No, no," but he had been personally mixed up for the last 25 years with joint-stock companies, though not as a director, and he maintained that the Directors of the North-Eastern Railway Company, with the enormous work they had to do, only divided the same amount as the Directors of this Company did; and although they might not now agree with him in what he said with respect to the expenses of the Company, the time would come when they would seriously take the question into their consideration. He was speaking without the slightest reflection on any of the Directors. He would not have invested his money in the concern if he had had any doubt on that subject; but he maintained the accuracy of what he had stated. Some directors of large companies received £2000, in other cases they had £3000; but these were nothing to compare with what the Directors of this Company received. The Directors only had the same interest in the undertaking which the other Shareholders had; and the only difference between them was, that the Directors were elected to that position by the other Shareholders, and yet they received £7000 a year. The question would have to be investigated either by the Shareholders or the Government. There were other charges in the accounts, with which, however, he would not trouble them, except as to the charge for printing, &c. (over £3000), which, as compared with other companies, was enormous. Then, again, they could not mention any other company where the auditors were paid at such a high rate as in this one, considering, too, the amount they paid to the Official Auditor. He had looked carefully into the matter, and he held that if there were to be an increase in their dividend, it must be by a more economical management. The Directors themselves ought to introduce into Parliament a Bill empowering them to lessen the number of the Board, and in that way diminish the amount paid to them. He was not in favour of interfering with any existing arrangement, but the Board in future should be fewer in number, and the amount paid to them would be consequently lower.

Mr. H. Wiggin thought they had every reason to congratulate themselves on the continued prosperity of the Company, and he for one held that their thanks were due to the Board for the very able manner in which the Company had been carried on. He thought the Directors were deserving of the warmest thanks of the Shareholders for managing the concern in such a manner as to pay 10½ per cent.; but he held that if they gave too high a dividend they would have competition right and left of them. The reserve-fund, he saw, stood at about £150,000. He had had no opportunity of referring to their Acts; but some gas companies with which he was connected had the power to put by a reserve of 10 per cent. on the amount of their capital, so that they should have something to fall back upon in hard times to equalize the dividends. He did not know if this Company possessed such a power, but, if they did, he was sure the Shareholders would be delighted if the Directors would limit the dividend to 10 per cent., and put by an amount which would ensure the continuance of such a dividend. He was confident that this would increase the value of their property. He noticed in the report that they complained of the difficulty of disposing of their coke; but any one connected with gas companies knew the great difficulty there was in the matter. A company which he was in had recommended householders to adopt it for domestic purposes, especially in suburban and rural places, and for use in conservatories, and by this means they had largely increased its consumption, and so had disposed of 50,000 tons of coke at very much higher prices than had been mentioned as having been received by this Company. The mode in

which the Company he had referred to proceeded, was to make a statement at the back of every account, mentioning the price at which coke would be supplied at such and such a place. They were inundated with orders, and he threw out the suggestion for this Company to adopt it, if they found that it would be advantageous to do so. He then asked what falling off must take place in the present rate of dividend on the ordinary stock before the 7 per cent. H shares would be affected.

The DEPUTY-GOVERNOR: 3½ per cent. It would amount to a falling off of £160,000 a year.

Mr. WIGGIN expressed his satisfaction at the statement that the result of the working of the residuals had so far proved satisfactory; but he would warn the Directors that there were "rocks ahead" in this quarter, not especially as regarded this Company, but as regarded all who were connected with the manufacture of gas residuals. The present price of sulphate of ammonia was higher than ever, chiefly owing to the war between Chili and Peru, and in consequence of the inability to obtain nitrate of soda. However, if they had a better market for the sale of their coke, they would be able to stand a considerable reduction in the price of sulphate of ammonia without materially affecting the interests of the Company. He would take this opportunity of thanking the Directors, and as long as they paid him 10 per cent. he would not complain of the amount of their fees. The labourer was worthy of his hire, and if the management of their affairs by the Board enabled them to pay 10 and 10½ per cent. dividends, he should feel it rather mean on the part of the Shareholders if they begrudged the remuneration paid to the Directors.

Mr. H. J. BADDELEY thought they ought to be very much indebted to those Proprietors who attended the meeting and showed their interest in the Company's affairs by ventilating details as to the management, but he thought that those who spoke ought to make themselves thoroughly acquainted with the facts which they laid before the meeting. As to the sliding scale, he had had some experience. The initial price of this Company for gas of a certain standard of illuminating power was 3s. 9d. per 1000, and for every 1d. they reduced the price to the consumer they were entitled to advance their dividend by 5s. per cent. The standard or initial price simply gave them a 10 per cent. dividend. The sliding scale would therefore enable them on this occasion to pay not 10½ but 10¾ per cent. to the Shareholders, because they had been supplying gas at 3s. 6d. per 1000 feet during the year over which the dividend was earned. With regard to the reduction of price, he made no question, because it was the duty of the executive to take into account everything which affected the interests of the Company, and to form their own judgment and act on it. In the announcement made in the report, the Directors stated that they had reduced the price, from the 1st of January, to 3s. 4d. per 1000 feet, the practical effect of which would be that if this price continued during 1880, they would be enabled, if they made sufficient profits, to pay not only 10½ per cent., but the ¼ per cent. which the price of last year would enable them to declare, and an extra ¼ per cent. for the present year, in consequence of their reducing the price to 3s. 4d. The reduction of the price *must* be antecedent to any increase of the dividend. It was an experiment, and the experiment must be made by the Board before there could be any increase of dividend. By reducing the price, by another 2d., to 3s. 4d., they would be enabled to give an extra ¼ per cent. if they could make sufficient profit to do so. As to the question of the emolument of the Board, that question had been fully discussed before Parliament, and by the Board of Trade acting for Parliament. They had determined that the amalgamations which had taken place had been for the interests of the public (if not for the Shareholders), and the existing condition of things must remain, as to the remuneration fixed for the Directors, till some parliamentary action was taken on it. He hardly thought that such action should be initiated by the Board of Directors or by the Proprietors. As to the electric light, he regretted exceedingly that the matter had been mentioned at all at this meeting. He had become thoroughly habituated to the electric light scare. It reminded him of the old story of the negro who had a drunken master. One day a gentleman called to see the master, but the negro said he could not be seen. "Why?" asked the visitor; "is he drunk again?" "Oh, no, sa," replied the negro; "not drunk again—the same old drunk." So with the electric light scare—it was always the same old scare again.

Mr. S. JACKSON wished to know on what ground the Directors had this year added such a small amount to the reserve-fund. Coals, he said, must rise in price, and then their profits must necessarily diminish, and the dividends decrease. He thought the matter should be reconsidered. He should like to see the reserve-fund stand at £500,000, as he thought this would enable them to look forward and meet the future, whatever might arise. He hoped that before the meeting closed they would receive some assurance that, if it was not judicious to add more than £10,000 last year to the reserve-fund, more would be transferred to it on a future occasion. He considered this was a most important matter. As to the remuneration of the Directors, he thought it would be one of the falsest economies they could adopt, to proceed in the way mentioned by one of the speakers. There was no comparison whatever between the North-Eastern Railway Company and this Company, for in the first-mentioned Company the dividend constantly fluctuated, and was altogether uncertain.

Mr. GRAHAM asked whether the item of "Experimental street lighting," £329, did not mean the improved lighting of Regent Street and Waterloo Place.

The DEPUTY-GOVERNOR: Yes, and Queen Victoria Street.

Mr. GRAHAM said his object in asking the question was to thank the Directors for having carried out such an experiment. A friend of his, who was connected with the electric light, said, when he saw the improved gas light, "that it would be their settler;" and so he (the speaker) thought, for nothing could be more beautiful. It was true that the Chartered Company were not the first to show the improvement, but the Phœnix Company; yet he thought the trouble and energy the Directors had displayed in introducing the improved lights called for the greatest praise on the part of the Shareholders, showing, as it did at once, what could be done with gas. He thought there was no comparison whatever between such a light and the electric light; and he thought the Directors deserved a separate vote of thanks for the energy they had displayed in the matter.

Mr. W. J. SMITH expressed some surprise that Argand burners were not more extensively used in the streets of London, and said that there was no comparison between the gas light in Queen Victoria Street and the electric light on the Thames Embankment. He, however, thought that if the burners were placed 10 or 15 feet higher, the light would show with much more effect.

Mr. J. N. SHOOLBRED said that, as his name was somewhat connected with the electric light, he might mention that it was the opinion of his scientific friends, as well as his own, that all the reports as to recent discoveries in America were considerably exaggerated.

The GOVERNOR: I will reply *seriatim* to the different questions put. As to the electric light, it was not my purpose, or the purpose of the Board, to have referred to it in any way whatever. I think the more it is left, the better. As Shareholders in this Company we have suffered to a considerable extent. We say nothing about it, and I should have said nothing about it but for the nefarious purposes for which this electric light agitation has been raised. I may state that in this Company during a very short time, and during lately, our shares were down to 160 and up to 180½. Therefore, that shows the terror which must have been infused into people to have induced them to part with their property at such an absurd price. I should not have made any mention of the subject but for that. I really think it is highly reprehensible that any class of people should combine or conspire on both sides of the Atlantic, by fraudulent and wicked statements, to depreciate our property, so that they are enabled to purchase at very low prices. Sir Mordaunt Wells very truly said that it does show very great confidence, as I stated in my opening address, that the Proprietors of the Company absorbed the whole capital we were recently enabled to allot. As to the reduction of the price of gas, that subject came under the earnest consideration of the Board before we adopted it. We reviewed our present position financially, and we reviewed our future position as we hope it will turn out; and we felt ourselves fully justified in making the Act which enables us to adopt the sliding scale, a reality both in the interests of the public and of the Proprietors. The honourable gentleman seemed to forget that the late reduction would not affect dividends till the end of this half year. We shall not be able to increase our dividend on the last reduction till next half year's meeting. The Proprietors must consider this—that it is no light matter making a reduction, even of the very small amount of 2d. per 1000 feet. It may appear to the consumers as nothing for a gas company to reduce their price by 1d. or 2d., or even more per 1000 feet; but I can show you, from the effect it has on our accounts, that it is a reduction which ought to be very highly appreciated and received most thankfully by the public, for every 1d. per 1000 feet we, in the past, reduced the price of gas has been a dead loss to the Company of £40,000 a year. Therefore on the last reduction we made our loss has been £40,000, and now from our increased operations, 1d. per 1000 feet reduction amounts to £50,000, which is a very large sum taken off our balance-sheet; and it would have been madness on the part of the Directors if they had not looked into this subject with the greatest care, so as to see if they were not justified in doing it, and fully justified in the expectation that they would be able to pay a dividend in excess of what we now pay. As regards the expenses of the Company, I wonder the honourable Proprietor did not attend some other meetings; for, as it proves to be the fact, this Company (the Chartered Gas Company) is the most cheaply managed Gas Company in London. I will read to you an extract from Mr. Field's last published Analysis of the Accounts of the Metropolitan Gas Companies, for the sake of your information, and acting up to what Mr. Baddeley says—that gentlemen ought not to come here and make statements they cannot well bear out. The general expenses of this Company, per ton of coal carbonized, is 1·22s.; the next company (I will not mention names) is 1·67s., and others are 1·91s., 1·85s., 1·71s., and 2·58s.; thus showing that this Company is the most cheaply managed Gas Company in London. As to comparing this Company, and the work the Directors do here, with the work of a railway board, it is absurd. They do not do one-tenth part of the work we do here, and they also have, what we have not—the privilege of travelling free all over the country. The Directors are fully satisfied with the dividend that we are now paying, according to our present condition. We could have paid an extra 5s. per cent., but we preferred putting the money to the reserve-fund, in accordance with the generally expressed wish of every meeting of the Proprietors I have had the honour and pleasure of attending. As to the lighting of Queen Victoria Street and Regent Street, that was done at the Company's expense, and I believe truly it has been an expense which has been fully justified, and bears the good fruit that one honourable Proprietor mentioned.

The motion for the adoption of the report was then put, and carried unanimously.

The SECRETARY next read the resolution declaring the various dividends on the different stocks, which also was carried unanimously.

The Governor then left the chair, which was taken by

The DEPUTY-GOVERNOR, who said that the reason why the Governor had vacated the chair was that he retired from the Court by rotation, but he offered himself for re-election. The Proprietors knew the way in which the Governor had conducted the affairs of the Company, and the amount of time he devoted to their interests, despite the observations of Sir Mordaunt Wells. He believed that, in the proper form, the motion for the re-election should come from the Shareholders, and he was quite sure that the Governor had friends enough to move such a resolution.

Sir MORDAUNT WELLS expressed his pleasure at moving the re-election of the Governor, and observed that the remarks he had made were in perfect good faith, and not in any way reflecting on the Directors.

Sir THOMAS DAKIN, in seconding the motion, thought it came very well from Sir Mordaunt Wells, who was, no doubt, independent, and liked free discussion.

The DEPUTY-GOVERNOR put the motion, and it was carried unanimously.

The GOVERNOR, who resumed the chair amidst cheers, said: Gentlemen, I have had on so many occasions the pleasure and honour of addressing you, in returning thanks to you for the compliment you have so frequently paid me, that I can scarcely find words now to give effect to my feelings on this occasion. It is a most gratifying fact to me, after having been so many years in your service, and devoting my time and abilities, as far as they go, in advancing the interests of the Company, that I have lived to see it the first gas company in the world.

Sir T. DAKIN then moved the re-election of the other retiring Directors—Mr. H. E. Adair, Mr. J. Brickwell, Mr. U. J. Burke, Mr. R. T. Frere, Col. W. T. Makins, M.P., Mr. T. Paine, and Mr. B. L. Smith. He said he thought with such an excellent report, and the importance of the services rendered by the gentlemen mentioned, that it was unnecessary for him to say anything as to the desirability of re-electing them. He had had some experience as to the duties of the Directors on the other side of the table, and he knew the amount of labour and ability they gave to the work before them.

Mr. BADDELEY seconded the motion with pleasure, observing that if he said anything on the subject he should only depreciate the motion in their eyes.

The GOVERNOR put the resolution, and declared it carried unanimously.

Sir T. DAKIN next moved, and Mr. BADDELEY seconded, the re-election of the Auditors—Mr. J. S. Barker, Mr. H. W. Chisholm, and Mr. F. Farnan.

Sir MORDAUNT WELLS asked whether the Official Auditor was appointed by the Directors.

The GOVERNOR: No, by the Board of Trade; but he is, nevertheless, paid by the Company.

Sir MORDAUNT WELLS asked the amount that was paid to him.

The DEPUTY-GOVERNOR: The officials are paid for together in a lump sum, and we cannot tell what the Auditor receives.

The motion was carried unanimously.

Sir T. DAKIN then moved a cordial vote of thanks to the Directors for their valuable services, and the motion was seconded and carried unanimously.

The GOVERNOR: On behalf of my colleagues and myself, I beg to thank you most heartily for the confidence you place in us.

The proceedings then terminated.

BIRMINGHAM CORPORATION GAS SUPPLY.

The Annual Report of the Birmingham Corporation Gas Committee, which will be presented at a special meeting of the Town Council to be held to-day, is as follows:—

Your Committee report that they have given instructions for the disposal of the plant at the Fazeley Street works, and that they have invited offers for the purchase, or rent, of the site and buildings.

They have, as authorized by the Council, accepted the following tenders for the new gasholder and tank at Swan Village:—Aird and Sons, tank, £18,190; C. and W. Walker, holder, £14,371.

Your Committee report that the siding from the Windsor Street branch of the London and North-Western Railway is now completed, and that they have authorized the expenditure of £1400 on the construction of a 2-feet tramway from the siding into the present retort-houses, and in the provision of waggons for the delivery of the coal alongside the retorts. They have also authorized the expenditure of £750 in the purchase of a second locomotive for use at the Saltley works.

Your Committee report that, in pursuance of the policy recommended in their report to the Council in December, 1878, they have refused, whenever possible, to make extensions or additions to the mains in the purchasing districts without the consent of the Local Boards. They have recently, however, been compelled, by the action of consumers in Langley, to make additions to the mains in the Oldbury district, without the consent of the Oldbury Local Board. Their attention having been directed to statements made at a subsequent meeting of the Local Board, they instructed the Secretary to address the following communication to the Clerk to the Board:—

Corporation of Birmingham, Gas Department, Jan. 17, 1880.

A. Wright, Esq., Clerk to the Oldbury Local Board.

Dear Sir,—At a meeting of the Gas Committee, held on Monday last, the attention of the Committee was directed to statements reported to have been made at the last meeting of your Board, with regard to the action of the Gas Committee in relaying mains at Oldbury. As the motives and wishes of the Committee appear to have been much misunderstood, I was then instructed to ask you to lay before your Board the following statement:—

It appears that it is alleged, chiefly, that the pressure at Langley having been sufficient last winter, there is no necessity for the work now; that the Gas Committee must, therefore, be actuated by some unworthy motive; and that the work has been undertaken without notice to your Board.

With regard to these allegations, I am instructed to remind you that the Gas Committee, being anxious to avoid, as far as possible, disputes with your Board, have refused, in every instance when they could do so under their Act of Parliament, to make extensions or alterations of mains in the Oldbury district, pending the transfer. All applicants for such extensions, including the Chairman of your Board, have been informed that they must either obtain the consent of your Board to the extension, or must themselves pay the cost of it. The Committee have, indeed, carried this principle so far, that on one occasion, when it became necessary to incur a small outlay in lowering a main, and relaying the services from it, they obtained the consent of your Board before proceeding with the work.

On reference to the minutes and correspondence of the Gas Committee, I find that, in November, 1676, Mr. Showell complained of the deficient supply at Langley, and that our Engineer then reported that a satisfactory supply could only be given by the relaying of the mains in Oldbury. On this, the Committee informed Mr. Showell that they were anxious, under existing circumstances, to avoid the expenditure of the large sum that would be necessary. In May, 1877, a similar complaint was received from the Arden Brewery Company, who were told that the Committee were unwilling to move in the matter.

In November, 1877, numerous complaints were received from consumers in Langley, and the Committee, aware that they were running considerable risk of proceedings against them for the penalties provided in cases of insufficient supply, but, nevertheless, still anxious to avoid a large expenditure, made some improvements and alterations in the mains supplying Langley, which they hoped would relieve them from the difficulty of their position. The supply was improved to a small extent by these alterations, but in the following month Mr. Showell again complained, and the Committee informed him of what had been done, and of their unwillingness to do more unless the Oldbury Local Board would not raise difficulties.

Complaints from other consumers in Langley have been continually made until the present date, and, so late as the 30th of October, 1879, Mr. William Smith, of Langley, was informed that the Committee were not willing to undertake the required work.

On Dec. 10, Mr. Showell wrote to me that he had been obliged to use petroleum lamps in his office, and asking whether we could not improve the gas supply. On the 12th of December, in answer to my reply, he wrote that he had long forborne to put any undue pressure on the Gas Committee, but that he could not have his business stopped, and he gave me notice in this letter of his intention to claim compensation. In the meantime, Mr. France had written to me, informing me that he should make a claim in respect of the deficient supply to his house and to the Temperance Hall, and Mr. William Smith had given me notice of his intention to obtain, with others, legal assistance. These complaints were substantiated by an official complaint from your Surveyor and Inspector of Nuisances, of a deficiency in the supply to Langley.

On this I wrote to you, on the 15th of December, informing you that the Gas Committee would meet on the 22nd, when they would have to consider whether the work should be done, under section 8 of the Oldbury Gas Act.

In the meantime, an application was made for a supply of gas to Mr. D. M. Sadler's new brewery at Langley; and, as the Committee could not, under their Act, refuse this supply, they had seriously to consider their position. Their Engineer informed them that any further supply to the district would undoubtedly reduce the pressure to a lower standard than that prescribed in the Act of Parliament, and in that case the Committee would become liable to all the consumers in the district for penalties. It therefore appeared to them that they had no further choice in the matter, and, not having received any reply to my letter to you of the 15th of December, and having, therefore, no reason to suppose that objections would be made by your Board, they gave instructions for the work to be done, and you were informed of their decision in my letter of the 23rd of December.

It appears to be assumed by your Board that increased pressure at the works would meet the difficulty. The Gas Committee have not, however, undertaken the work without first making careful experiments on this subject. It has been ascertained that with a pressure of 3¼ inches at the works, the pressure on the 4-inch main at Langley is insufficient to comply with the requirements of the Act; that an increase of the pressure at the works to 4 inches only affected in a very slight degree the pressure at Langley; and, if this increased pressure had been sufficient, I need not point out to you that no competent Gas Engineer would recommend that such a pressure should be maintained at the works.

With regard to the illuminating power, I may remind you that, in my letter of Dec. 15, I stated that the illuminating power had been well maintained. I may now add that our works have been open for some time past to an officer appointed by the Wednesbury Local Board, with full liberty to make independent tests, and that he has reported to his Board that the illuminating power is considerably in excess of the parliamentary standard.

The cost of the work will not exceed £700, and the Committee will endeavour to carry it out in the most economical manner possible.

The Committee regret to notice some of the statements which are reported to have been made at your Board, but they do not feel that they should do more now than ask you to lay before it this statement of the facts of the case.

(Signed) Edwin Smith, Secretary.

In their reports to the Town Council in February and May, 1879, your Committee stated that it would be necessary, before the winter of 1880, to provide additional manufacturing power, and that, as the greatest manufacturing capacity had been reached at the other works, these additions could be best provided at the Windsor Street works. Your Committee have also reported to the Council that the additions to purifying and other plant at Windsor Street, authorized during the past year, have been planned with a view to the ultimate increase of the carbonizing plant. They are of opinion that it is now necessary to proceed with these further extensions, and they recommend that they be authorized to obtain tenders and to make contracts for a new retort-house, new exhauster, engine, and boiler houses, and exhauster at Windsor Street. They estimate the cost of these works at about £75,000, and the addition to the maximum daily make at 6,750,000 cubic feet. They propose to spread the expenditure over two or three years.

Your Committee report that the amount unexpended of the capital authorized under the provisions of the Corporation Gas Act is £121,488 5s. 11d., which the Committee do not think sufficient for the requirements of the undertaking. The Council have authorized additional works now in progress at Windsor Street and West Bromwich works, which are estimated to cost £52,000. Having regard to this expenditure, and to the extensions at Windsor Street now proposed, your Committee recommend that they should be authorized to apply, when necessary, to the Local Government Board, for power to borrow, from time to time, a further sum of £125,000.

Your Committee report that, on the advice of counsel, and of the solicitors engaged in the case, they have consented, on the withdrawal of the action commenced against them by the liquidator of R. R. Kelly's estate, to pay a sum sufficient to cover the plaintiff's costs, it being a condition of this arrangement that, if there has been any informality in the liquidation of the chemical company, a formal liquidation shall now be effected, and the previous acts of the Corporation confirmed. They report that, on the part hearing of the cause, *Hipkins v. Corporation*, they consented, on the advice of their counsel, to pay a sum of £200 and the plaintiff's costs.

Your Committee report that the Arbitrators and Umpire fixed the hearing of the arbitrations in the Smethwick, Oldbury, and Tipton cases for the 19th of December last. Your Committee being anxious that no further awards should be made until the principle of the award in the West Bromwich case is definitely settled, arranged with the Local Boards of these districts that, in consideration of their consent to the postponement of the awards until the appeal has been finally disposed of, a formal agreement should be executed, providing for the transfer of their portions of the undertaking on July 1, 1882; and also providing that, if the final awards have not then been given, a proportion of the profits derived from the undertaking shall be paid to the Local Boards from that date until the completion of the purchase on the final awards being made, the Local Boards paying interest on the amount of the purchase-money, and bearing their proportion of any loss on the undertaking. Your Committee report that, in pursuance of an arrangement made by their agents during the arbitration, they have agreed that, subject to the appeal in the West Bromwich case having been decided before the 1st of July next, the transfer of the West Bromwich portion of the undertaking shall be made to the West Bromwich Commissioners on that date.

The total quantity of coke in stock at the various works on the 31st of December, 1879, was 6060 tons, as against 34,203 tons at the corresponding period of 1878. Your Committee report that the sale of coke in the town was 49,286 tons in 1879, as against 38,383 tons in 1878.

The sale of gas for the year has been 2,645,996,200 cubic feet, as against 2,494,495,900 cubic feet in the previous year, being an increase of 150,900,300 cubic feet, or at the rate of 6 per cent.

The number of new services laid during the year was 2557, as against 2912 in 1878.

169 official tests of the illuminating power of the gas were made during the past year, the highest being 18·04, the lowest 16·55, and the average 17·22 candles, being about 2¼ candles in excess of the parliamentary standard.

The number of cooking and heating stoves and gas fires supplied by the department during the year has been—

Gas fires	289
Cooking stoves on hire	138
Cooking and heating stoves sold	371
Total	798

Your Committee have much pleasure in submitting herewith the annual balance-sheet and statement of accounts. The net profit for the year amounts to £51,165 18s. 4d., and your Committee recommend that the balance of the profit and loss account be appropriated as follows, viz.:—£25,000 to the borough improvement rate, and £26,165 18s. 4d. to the sinking-fund for the redemption of loans and annuities. Your Committee report that they have informed the Finance Committee of the Council that they hope to place £25,000 to the credit of the borough improvement rate in the present year.

Statement of Accounts for the Year ended Dec. 31, 1879.

Loan Capital.

Description of Loan.	Rate per Cent. of Interest.	Total Amounts Borrowed Dec. 31, 1879.	Remaining to be Borrowed.	Total Amount Authorized.
Mortgages	4½	£2,500 0 0		£2,000,000 (calculating the annuities at 20 years purchase. At 25 years purchase, amount would be £2,274,824 15s.)
	4	713,782 16 4		
	3½	86,600 0 0		
	3¼	37,500 0 0		
Debenture stock	4	48,650 0 0	£11,668 3 8	
Annuities (capitalized at 25 years purchase)		1,374,123 15 0		

Dr.—*Capital Account.*

	Expenditure to Dec. 31, 1878.	Expended this Year.	Total to Dec. 31, 1879.
To Expenditure to Dec. 31, 1878	£2,131,442 8 0	—	£2,131,442 8 0
Since that date—			
Extension of buildings, manufacturing plant, machines, storage works, and other structures connected with manufacture	24,794 3 11	—	—
Less plant abandoned	5,000 0 0	—	—
		£19,794 3 11	—
New mains, and other works connected with distribution		1,085 17 8	—
New meters (not in place of old ones)		1,013 19 6	—
			21,894 1 1
Total expenditure			£2,153,336 9 1
Balance of capital account			109,820 2 3
			£2,263,156 11 4

Cr.—*Capital Account.*

	Certified Receipts to Dec. 31, 1878.	Received during Year.	Total Receipts to Dec. 31, 1879.
By Debenture stock	£48,650 0 0	—	£48,650 0 0
Mortgages and bonds	840,293 19 5	£88 16 11	840,382 16 4
Annuities (capitalized at 25 years purchase)	*1,374,123 15 0	—	1,374,123 15 0
			£2,263,156 11 4

* After deducting capitalized value of the annuity payable by the Corporation of Walsall.

Dr.—*Revenue Account.*

To Manufacture of gas—			
Coals, including carriage, unloading, and all other expenses of depositing same on works	£157,629 10 0		
Purifying materials and wages	3,952 0 2		
Salaries of Engineers, Superintendents, and Officers at works	2,771 17 4		
Wages at works	38,489 14 10		
Repairs and maintenance of works and plant (including renewal of retorts), machines, apparatus, tools, materials, and labour; less old materials sold	52,869 2 9		
		£255,712 5 1	
Distribution of gas—			
Salaries of Chief Inspector, Inspectors, Assistant Inspectors, and Clerks in Light Office	£9,712 0 10		
Repairs, maintenance, and renewal of mains and of service-pipes, including materials, laying and paving, and labour	16,015 19 9		
Repairing, renewing, and refixing meters	9,534 18 3		
		35,262 18 10	
Public lamps—			
Lighting and repairing		4,075 14 1	
Rents, rates, and taxes—			
Rents	£809 5 9		
Rates and taxes	14,196 16 5		
		15,006 2 2	
Management—			
Salaries of Secretary, Accountant, and Clerks	£1,866 13 1		
Collectors commissions and salaries	1,410 4 9		
Stationery and printing	890 14 5		
General establishment charges and incidentals	2,953 4 1		
Auditor	52 10 0		
		7,173 6 4	
Law and parliamentary charges		1,639 18 4	
Bad debts		2,251 4 9	
Expenses on loans		201 15 0	
Bank charges		100 0 0	
Cost of maintaining recreation grounds at Nechells		£380 7 1	
Total expenditure		£321,803 11 8	
Balance carried to profit and loss account		142,261 4 0	
		£464,064 15 8	

Cr.—*Revenue Account.*

	Cubic Feet.		Per 1000 Cubic Feet.		
By Sale of gas—					
Common gas,	5,871,700	at	4s. 0d. & 4s. 3d.	£1,175 2 10	
Ditto	4,272,200	,,	3s. 10d. & 4s. 1d.	818 19 10	
Ditto	4,430,700	,,	3s. 8d. & 3s. 11d.	812 6 0	
Ditto	3,619,500	,,	3s. 6d. —	633 8 2	
Ditto	592,385,600	,,	3s. 0d. & 3s. 3d.	88,896 15 4	
Ditto	451,056,800	,,	2s. 10d. & 3s. 1d.	63,921 4 6	
Ditto	612,201,400	,,	2s. 8d. & 2s. 11d.	81,656 16 2	
Ditto	819,222,500	,,	2s. 6d. & 2s. 9d.	102,436 16 11	
Public lighting and under contracts				22,083 14 2	
				£362,455 3 11	
Deduct adjustment for stock, &c.				48 14 2	
				£362,406 9 9	
Less discounts and adjustments				15,696 17 7	
					£346,709 12 2
Residual products—					
Coke, less labour and cartage				£41,368 10 8	
Breeze, do. do.					
Tar				33,196 1 7	
Ammoniacal liquor				38,199 3 11	
Sundry residual products				129 6 0	
					112,893 2 2
Rents					1,537 1 4
Fittings					1,954 18 6
Discounts on purchases					960 6 6
Transfer fees					9 15 0
					£464,064 15 8

Dr.—*Profit and Loss Account.*

To Amount carried to reserve-fund account from profits of 1878	£7,152 2 0	
Amount carried to sinking-fund from profits of 1878	22,679 15 8	
	£29,831 17 8	
Interest on mortgages and bonds, accrued to Dec. 31, 1879	32,191 1 8	
Interest on debenture stock to Dec. 31, 1879	1,946 0 0	
Annuities	54,964 19 0	
Sinking-fund, for redemption of loans and annuities	4,104 14 7	
Balance, being net profit for the year	51,165 18 4	
	£174,204 11 3	

Cr.—*Profit and Loss Account.*

By Balance of net profit brought from last account	£54,831 17 8
Less amount paid to borough improvement fund	25,000 0 0
	£29,831 17 8
Balance brought from revenue account being profit for the year to Dec. 31, 1879	142,261 4 0
Interest on amount invested on account of reserve-fund	2,000 0 0
Interest allowed by bank	111 9 7
	£174,204 11 3

Statement of Coals.

Description of Coal.	In Store, Dec. 31, 1878.		Received during Year.		Carbonized or Used during Year.		In Store, Dec. 31, 1879.	
	Tons.	Cwt.	Tons.	Cwt.	Tons.	Cwt.	Tons.	Cwt.
Common	20,906	17	316,231	8	312,147	7	24,990	18
Cannel	1,108	1	4,712	15	4,764	1	1,056	15

Statement of Residual Products.

Description of Residual.	In Store, Dec. 31, 1878 (estimated).	Made during Year (estimated).	Used in Manufacture during Year (estimated).	Sold during Year.	In Store, Dec. 31, 1879 (estimated).
Coke—common, chaldrons of 36 bushels	76,006	384,477	111,406	335,467	13,610
Breeze—ditto	5,946	19,146	5,254	16,030	3,808
Tar—gallons	83,599	3,726,274	—	3,735,473	74,400
Ammoniacal liquor—butts of 108 gallons	3,366	91,804	—	93,859	1,311

THE JARROW WORKS OF THE SOUTH SHIELDS GAS COMPANY.

Last Tuesday, at the invitation of the Directors of the South Shields Gas Company, the Jarrow works of the Company, which are now fast approaching completion, were visited by a considerable number of the Shareholders, and much interest was manifested in the inspection of the works and plant.

Since the new works were commenced they have assumed considerably greater magnitude than at the time was thought possible. The original works stood upon a portion of the present site—an exceedingly advantageous one from its central position and its proximity to the landing-stage of the Tyne General Ferry Company and the Corporation Quay. It was, however, felt to be desirable that direct communication with the river should be obtained, and as an opportunity for this occurred during the progress of the work, the Directors of the Company readily availed themselves of it by acquiring some adjacent chemical works. The advantages of this extension cannot be over-estimated, as the two sites will be connected by a bridge across Ferry Street, and the whole work brought into direct communication with the river. Not only will the work be thus facilitated, but there will be economy in the manufacture, and the Company have also room to make future extensions.

The works, which are considerably advanced, will have a productive power equal to a million cubic feet of gas per day. They have been in operation now about six months, and have given satisfaction in their general working. The plan of the works is an exceedingly simple one, the structures and apparatus being arranged in three parallel blocks—the first, the gasholders; the second, the retort-house; and the third, the purifying plant.

With reference to the first, the tanks for the holders were constructed a few years ago, and one of the holders was erected. The contract for the other was made some little time since, and the work will be completed during the coming summer.

In the second block—the retort-house—a change in the usual structures is at once apparent, openings being arranged along the side of the house, and girders running parallel through them, with buckets of coke travelling along them, and depositing the coke upon the heap forming under the girders. In the interior of the house there is a still greater change—a portion of the flooring being removed the whole length of the house in the front of the retort arches, and rails being laid along for a carriage to travel on; the girders from the yard extending over the tops of the retort arches, from which are suspended long trough-shaped buckets; and, further, there is a whirr of machinery to be heard, which, to those accustomed to an ordinary retort-house, will be a greater novelty than anything else.

Though in the matter of detail there are in the house some novelties that may be worthy of notice, yet the great object of attention is the machinery for doing the work. This is constructed according to the patent of Mr. W. J. Warner, the Engineer of the works; and it is the outcome of long years of patient toil to perfect apparatus that should be efficient for the performance of the various operations in the retort-house. The motive power for the machine is that of a steam-engine of 10-horse power, which is communicated to a travelling machine by an endless rope running at a very high speed—about 6000 feet per minute. The engine also drives two shafts running the whole length of the house—one for communicating motion to the hoists or cranes, of which the parallel girders of the coke and coal buckets form a portion; the other for the purposes of driving revolving diggers for feeding the coal buckets from bunkers or coal stores in front of the retorts. The machine for charging and drawing the retorts, being driven by the endless rope, moves to and fro along the house in front of the retorts, and is supported by a carriage running on the rails. The carriage also carries a platform, upon which the men stand to attend to the retorts and actuate the machinery. The drawing and charging tools are supported and adjusted by a screw ram. The work of the house consists of three operations—getting the charge of coal ready for feeding the machine, the charging and drawing, and the removal of the coke from the house as it is drawn from the retorts.

For the feeding operation the coal bucket is lowered, and the two compartments, into which it is divided for the two charges for each bed of retorts, are filled by the revolving diggers from the bunkers. The bucket is then raised by the hoist and left, the whole of the buckets thus being filled and kept suspended till the time of charging. The next portion of the work is to actuate the machine drawing the charge and re-charging the retorts. This is done, after adjusting the tools, by causing the machine to travel into position in front of the first retort. The coke falls into a bucket under the machine, which then moves on to the next retort. As the retorts are at equal distances apart, the moving of the machine to the second retort brings the scoop into position to charge the first. The charge in the buckets is delivered into the scoop by releasing the hinged bottom of the bucket; and the scoop is then thrust into the retort, the charge of coal delivered, and the scoop withdrawn and put into position to receive the other charge; the machine moving on to the next retort, and so on along the whole of the house. The third part of the operation is that of removing the coke. This is done after lowering the empty coal bucket, by lifting the coke buckets by the hoist, and propelling them along the girders into the coke yards, where they deliver their loads, and are then returned to the house. Fresh charges of coal are thereupon raised, and the work proceeds with but little labour beyond that of actuating the machinery. This is but slight, there being great control over the whole apparatus, the men working it being able to adjust the tools vertically and longitudinally by just a pull of a handle.

In the purifying-house there is the same indication of a desire to lessen, as far as possible, the amount of manual labour employed. There is a travelling crane, a joint arrangement of Mr. Warner and Mr. Hopkinson, of Manchester, to be driven in the same way as the machinery in the retort-house, by an endless rope; and it is not only used for the purposes for which cranes in such places generally are, but is also adapted for raising and distributing the purifying material. It is so easy of manipulation that the youngest son of Mr. Warner, a child nine years old, last Tuesday set it in operation and stopped it. At the end of the purifying-house are the boilers, the engines, and the exhausters; and this machinery is of first-class finish, and very effective.

The buildings themselves are of a composite character in construction, being erected partly of concrete and partly of fire-brick. The roofs of the whole have an exceedingly light appearance, and have in connection with them some novelties worthy the attention of those interested in such structures. The Company have not yet erected offices, but we understand that this is contemplated when the works are further advanced. Of course, the leading feature of the works is the machinery, which has undergone a severe test during the six months it has been in operation; and altogether the work reflects great credit on the enterprise of the Directors in thus meeting the requirements of the district.

It is but due to Mr. Warner, the Engineer to the Company, to again say that to him must credit be given for all the improvements to which we have referred. The makers of the machine, for which Mr. Warner has several patents, are Messrs. Higginbottom and Mannock, of Manchester. Messrs. C. and W. Walker, of Donnington, were the Contractors for the

gasholders, roofs, and purifying plant; Messrs. Wren and Hopkinson, of Manchester, for the travelling crane; Messrs. Hanna, Donald, and Wilson, of Paisley, for the engines and exhausters; the Birtley Iron Company, for the connections, hydraulic mains, ascension-pipes, &c.; Messrs. John Abbot and Co., Limited, for the boilers and fittings; and Messrs. J. Cowen and Co., for the retorts, which are used with Morton's patent lids. Mr. W. Whyte has been Resident Engineer, and has rendered good service to Mr. Warner in his arduous work. It is due also to the late Assistant Engineer of the works (Mr. W. Belton, now Engineer and Secretary of the Shrewsbury Gas Company) to say that he was engaged with Mr. Warner for a considerable time upon these works in their earlier stages.

After the inspection of the works,

Mr. J. H. PENNEY (the Secretary of the Company) gave the following statement of the work already done by the machinery:—The machine has drawn and charged the retorts about 20,600 times; and in doing this work has travelled, backwards and forwards, a distance equal to 197 miles —142 miles in the first three months, about 55 miles in the next eleven weeks. This difference in the rate of working was owing to the incomplete state of the coal cranes, &c., in the first three months. Since the latter have neared completion, the work has been reduced to about one-sixth. Formerly, when working with only one bucket, the machine had to travel 728 feet each time; but this is now reduced to 121 feet. In travelling this extra distance, the machine has been subjected to a trial fully equal to 2½ years working.

VISIT OF THE RAMSGATE LOCAL BOARD TO THEIR GAS AND WATER WORKS.

On Monday, the 9th inst., the Gas and Water Committee of the Ramsgate Local Board invited the other members of the Board to join them in the annual inspection of the gas and water works.

After inspecting the offices, testing-room, and stores, the members, headed by the Rev. E. G. Banks, Chairman of the Commissioners and of the Gas Committee, were conducted by the Engineer (Mr. W. A. Valon), to the retort-house, where the method of carbonizing the coal was shown and explained, the process of manufacturing gas being traced from the retorts to the gasholder, the various apparatus employed therein being plainly but interestingly described. After the condensers, the new washer was viewed. In this a piece of glass was fixed, so that those present might see the interior construction and the action, the strength of the liquor being tested both at the inlet and outlet, as well as the quantity passed. The scrubber was next described, after which the engine-room was examined; and here every one was both pleased and surprised, the arrangements being of a most perfect kind. The purifiers were then visited, the station-meter and governor being in their turn minutely examined and explained. The new gasholder formed an interesting part of the visit, since it is the largest one of the kind in the vicinity of Ramsgate. Passing from the holder, the new sulphate of ammonia works were inspected, they being in full operation. This last addition to the works will, there can be no doubt, be the means of greatly increasing the profit made from the gas supply for the benefit of the town.

The visitors then proceeded to the Whitehall water-works, where the engines and boilers, which have recently been thoroughly overhauled and repaired, were seen. A cage was here prepared by which means any one desirous of descending the well might do so; while the temporary pumping machinery erected to keep the adits free from water while extending the tunnels formed a most interesting item in the inspection. By an ingenious device, the water already found is allowed to flow on to the ordinary pumping-station, while that in which the men are working is lifted by the temporary machinery. These new tunnels have been extended about 1100 feet, nearly doubling the original water supply. It was then proposed to proceed to the Southwood station, but, it being late and the weather rather unpropitious, the idea was abandoned, and the members returned home, evidently much gratified with the way that they had spent their afternoon.

SOUTHERN DISTRICT ASSOCIATION OF GAS ENGINEERS.

The First Quarterly Meeting of this Association for the present year was held at the Guildhall Tavern, London, on Thursday last, when the PRESIDENT (Mr. James Hunter, Engineer and Manager of the Woolwich Consumers Gas Company) read the following address:—

Gentlemen,—I thank you sincerely for the honour conferred by your election of myself as President. I highly esteem the confidence thus reposed in me, and trust I may be enabled to conduct the business of the Association to your satisfaction, being too cognizant of my deficiencies, and that there are many amongst you more fitted to hold this exalted position. I feel assured, however, of your kind forbearance to my faults, and assistance in promoting the well-being of the Association. To show that it has grown into a healthy condition, I need only mention that we now number 60 members. It has pleased the Almighty, in His all-wise providence, to preserve us during the past year, and although illness has affected one or two of the members, still no deaths have occurred. That the Association is very highly esteemed, is fully apparent by the additional number of members, some of whom are well-known, highly-respected, large-experienced, and liberal-minded members of our profession. It is to be trusted that this satisfactory condition may continue for many years, and it behoves us all to endeavour to maintain and improve our position by every means in our power.

We know and feel the great benefit derivable from thus associating together, without taking a prominent or ostentatious course; but in our quiet familiar discussions, much information has been conveyed, and now that it is proposed that a record shall be taken of what is stated, we hope it will act as a guide in our pursuit of knowledge, and as a permanent good to those coming in the future. It is not to be supposed that some of the opinions expressed will not hereafter be modified; but let such modifications be based upon a sure foundation, the result of maturer thought and greater experience. It might be thought that this would tend to prevent the expression of experience by the timid. That such will not be the case, we feel assured from past practice; each freely giving or soliciting an opinion without fear, the great principle ruling all, being to convey sound knowledge upon any matter under consideration. We would strongly urge upon all to continue to propagate this good and kindly understanding, as we believe the most talented of our members is not above the acquisition of knowledge, however humble the source from which it emanates, for we all know how acceptable is the assisting thought or hint in times of difficulty.

The papers read before the Association have led to much interchange of opinion, and no doubt considerable knowledge has been acquired or confirmed. One matter especially deserves mention—namely, the highly-interesting visit made to the works of our respected President (Mr. West), at Maidstone, for I feel certain that I only express the general sentiment in saying it was an enjoyable day, and well warrants the best thanks of the Association to the Directors of the Maidstone Gas Company and to Mr. West for the kindness and hospitality accorded to us. No gas manager could have been there without adding to his former knowledge. His eyesight was gratified by the utmost order, cleanliness, and good design prevailing, and his thoughts, present and future, would be occupied with new ideas; and what he observed was being done to alleviate our harder-worked brethren, doubtless created a desire to strive to do likewise.

The benefit to be derived by Mr. West's system of carbonization was clearly elucidated, and the plan is well worthy of adoption by all, where facilities permit, either in new works or extensions, or with a desire to cheapen production; and it gives me great pleasure to record the high appreciation of its merits by being placed in operation in one of the most prosperous and best conducted gas-works in the kingdom—viz., the South Metropolitan, of which Mr. G. Livesey is the Engineer. The system has been in use several years, and is now being applied in the provinces.

I must not pass unnoticed the excellent paper by Mr. Hammond, of Lewes, on "Purifying Gas by, and the Treatment of Ammonia," giving a detailed description of his patented process, and throwing some light upon an important and interesting subject. I trust that further success has attended his labours, and that it will be convenient to him to give us another paper on the subject on a future occasion.

An admirable paper was read at our last meeting by Mr. Townsend, of Waltham, "On the Use of Tallow for Jointing Gas-Mains." It was followed by an interesting discussion, and I hope to hear that the system of jointing therein recommended is applicable to the heavier Metropolitan traffic and street disturbance.

The Weights and Measures Act, and its relative effect on the sale of coke, has been under consideration, but has not resulted in any definite uniform system being adopted. I would urge a decision being arrived at at an early period.

During the past year the electric light has ebbed and flowed in its brilliancy before the public, so far as it affected gas stock; at the same time, some progress has been made in the adoption of lighting by the numerous systems. If, however, under the high pressure with which it has been urged forward, so small a result has been attained, and that with difficulty, gas companies have little to fear. Mr. Edison, if we are to believe newspaper reports, has something exceedingly brilliant to bring forth shortly; but this has been stated so repeatedly that confidence is much shaken in his being able to advance farther than his present position, and until more information is forthcoming it will be useless to speculate on the matter.

The period through which we have just passed has been marked by depression of general trade, but I trust that a revival has now set in. It is gratifying to find that the larger proportion of gas companies have not suffered in this respect, circumstances, so far as cost of material and sale of residuals are concerned, having greatly assisted them. This continued prosperity has not been without its effect, as may be observed by the reductions made in the price of gas. It is to be remarked that those companies who work under the sliding scale continue to advance in public favour. The success attending these cases of legalized co-operation is but a proof that much satisfaction and benefit are to be derived from serving the consumer liberally. After the repeated instances during past years of the advantages of the sliding scale to the parties solely or the most interested—consumer and company—it is clear that if the companies are only permitted to remain undisturbed for a year or two, its benefit will be much more exemplified. It is therefore to be deplored that numerous gas companies have been, and are in prospect of being absorbed by public authorities, who are to some extent irresponsible bodies—here to-day and gone to-morrow, at the caprice of the ratepayers, the bulk of whom may never be affected by the price of gas. The means whereby this is effected are such as few, if any, gas companies have been able to avail themselves of, and may be considered seriously detrimental to the commercial enterprise and welfare of the country at large; being, as they are, the deprivation of one of the few secure and remunerative means of investing the savings of the provident.

Instances of the beneficial results of amalgamation are not wanting, and those at present upon the *tapis* will, no doubt, result to the advantage of all concerned, if they are permitted to remain unembarrassed. This is a step highly to be commended.

There is a matter of more importance to gas companies than Edison's scares, and, I think, requires attention—viz., the use of petroleum or similar oils, which now enters, and will continue to enter into competition with gas lighting among a numerous class of the population. The improvements made in its combustion will no doubt have an effect in other spheres of gas consumption. The light is brilliant, convenient, and the cost agreeably small, while the periodical outlay for the oil is more suited to the financial position of smaller consumers than the quarterly charge of the gas company, which is frequently accompanied by the addition of what is by many considered to be an objectionable meter-rent. Cheaper gas is needed, and there is great risk in delaying its production. Are the facilities for gas manufacture to be derived from this oil? Being so rich in character, it may be capable of becoming an important aid even in the present system of gas-making, and worthy of trial, if only with a view of a reduction in the use and cost of coal. It is true the present supply of coal is abundant; and as new mines are being opened on the Continent, it may be considered inexhaustible. The Americans are stepping in advance in this respect; therefore do not let us lag behind. Depend upon it, there is the germ of greatness in it. Look well to it.

Purification, sulphur compounds, naphthaline, exposure of gas to tar, the hydraulic main, the dip-pipe, the seal, extraction of tar, settings of retorts, the regenerative furnace, and numerous other matters appertaining to gas production, have, no doubt, had your attention, and need not be mentioned now. The able articles recently published by Mr. R. H. Patterson in the JOURNAL OF GAS LIGHTING well deserve your perusal and study. That benefit has been derived from the much advocated system of exposing gas to the tar flowing from the hydraulic main is undeniable; at the same time, it may be capable of evil from its too long duration. I must, however, be permitted to leave the question an open one for the present.

Purification by lime, although efficient in the removal of sulphur compounds, requires further investigation, with a view of better results being obtained in point of economy. Most gas managers knew something of the chemical changes of material combinations, and were able to assign a reason for them; but few gas men or even chemists were acquainted with the manipulations of gaseous chemical or mechanical combinations as affecting coal gas, or the difficulties attending it, as illustrated by the erratic results of practical working. The affinity, if I may use the term, adhesion, or combination of one gas with another, even in the presence of a body known to be capable of the extraction or dispersion of one of them, though under favourable circumstances, has failed in producing the result desired—a result at variance with expectation or past knowledge. It is pleasing to know that some of these difficulties are being remedied by more perfect apparatus, such as Mr. Livesey's washer, which is giving great satisfaction. Mr. Anderson's brush-scrubber is also producing good results; and Messrs. Kirkham, Hulett, and Chandler's washer-scrubber is doing well.

The yearly increasing quantities of spent lime, the growing risk of complaints of nuisance from its use, and the difficulty of its disposal, are being much felt by gas companies, and when considering the cost and bulk of

the mass of purifying material, whether lime or oxide, daily being handled in London alone, to say nothing of the entire country, we must admit that it is enormous. A natural question arises—Cannot this be avoided? The various schemes, however, brought forth are not yet in the condition that would warrant the entire abandonment of the present system. Under these circumstances, Mr. Hislop's process for the revivification of lime well deserves our consideration. The capability of ammonia to purify gas is being pushed forward with commendable zeal, and the fact is fairly prominent that the residual products from the carbonization of a ton of coals will purify the gas obtained therefrom, and it is in my humble opinion by pursuing this course that we may expect to be independent of external aid, and obtain a perfect process unattended with present evils.

The heating of retorts by the regenerative or similar furnaces, is receiving attention; but at present I must leave these expensive luxuries to the larger companies, trusting to hear of their success.

I desire not to trespass too much on your time, or I should wish to have alluded to the gas-meter, public lighting, &c.; but there is a matter which cannot be passed unnoticed—viz., Sunday working. I will not enter much into the question, but confine myself to one or two remarks. The result of its discontinuance is very satisfactory, and greater attention should be devoted to this subject. It is not only a duty, for the welfare of the men and their families, but desirable on other grounds. Among others: The improved class of workmen, superior in every respect to what it was customary to see in gas-works; greater sobriety, better conduct and health, more attention to duties, and better time kept; less trouble and anxiety to those in charge—all these are advantages which, as practical gas managers, you can appreciate, and, therefore, it is not necessary for me to allude to them. Lastly, and not the least important, is the resulting general improvement and advancement of the companies affairs.

With many thanks for your kind attention, I will conclude by expressing my pleasure at seeing so large an attendance of members, and my regret that our Secretary is too unwell to be present among us.

In the evening the members dined together, a very pleasant gathering taking place. The chair was occupied by Mr. HUNTER, and the vice-chair by Mr. JAMES ELDRIDGE, of Richmond. In the unavoidable absence of the Secretary (Mr. J. L. Chapman) through sickness, Mr. D. F. GODDARD efficiently performed his duties. Dinner over, the PRESIDENT gave the toasts of "The Queen," and "The Prince of Wales and the rest of the Royal Family," in felicitous terms, and the toasts were heartily responded to. The toast of the evening, "Success to the Southern District Association of Gas Engineers," was ably proposed by Mr. T. R. RICHARDSON, Secretary of the Woolwich Consumers Gas Company, and replied to by the CHAIRMAN, who afterwards proposed "The British Association of Gas Managers," expressing regret at the absence of the Secretary of that Association (Mr. W. H. Bennett) through ill-health. This toast was responded to by Mr. CORBET WOODALL. The remaining toasts included the "Committee of the Southern District Association," humorously proposed by Mr. JOHN CHAPMAN, of Harrow, and replied to by Mr. C. GANDON, of the Crystal Palace Gas Company; the "Visitors;" the "Press;" &c.

THE OPPOSITION TO THE LIVERPOOL CORPORATION (VYRNWY) WATER SCHEME.

DEPUTATION TO THE LOCAL GOVERNMENT BOARD.

A deputation, representing certain public bodies of towns in Shropshire, Worcestershire, and Gloucestershire, which are receiving their supply of water from the source of the Severn, waited upon Mr. Sclater-Booth, the President of the Local Government Board, last Tuesday, in opposition to the Bill in Parliament now being promoted by the Liverpool Corporation, for obtaining water from the River Vyrnwy and other tributary streams of the Severn.

Earl BEAUCHAMP, who, in the absence of the Duke of Beaufort, introduced the deputation, said that the subject of the proposed new water supply to Liverpool was one of considerable importance. It was important first of all as regarded the trade of the Severn, next as regarded the fisheries, and also as regarded sanitary questions, which were involved in an adequate supply of water to the populations living on the banks of the river. With respect to the trade of the Severn, it was felt by those interested that it was a matter of great hardship that the trade should be interfered with; as they believed it would be, if the Bill now proposed by the Liverpool Corporation were allowed to pass into law. As regarded the fishery question, it would be idle on his part to contend that it should be placed in the scales as against the interest and commerce of a great town like Liverpool; but it was a very important question to consider in connection with the matter, and ought not to be overlooked, especially as there was reasonable ground for hoping that the supply of fish in the Severn would not always remain at the point at which it now stood, and that legislation would have the beneficial effect of developing this class of food. The really important question, however, was the sanitary one. Many of the towns situated on the banks of the Severn drew their water supply from it, and evidence could be produced that the Vyrnwy, which it was proposed to divert, contained the finest kind of water that was supplied through the medium of the Severn. The Severn watershed did not lie on the side of Liverpool, and the deputation felt that it was not right that the Corporation of that town should endeavour to avail themselves of the source of supply which was not within their own watershed, and that they should seek to tap another which was outside their area. The question of a National Water Supply to the people of this country was an important one, and he thought that before Liverpool was allowed to step in and appropriate one of the large watersheds of the country, this question ought to be well and carefully considered by Government. If Liverpool required so large a supply of water for sanitary purposes mainly, perhaps there could not be so great an objection to the scheme; but they would derive a large revenue from water sold for trade purposes, and which the deputation contended was a revenue derived from what was practically their own water. Liverpool, he maintained, ought not to come to the Severn for her water supply, as she was so placed that a supply could be obtained from the Cumberland district. There was an unanimous feeling in the districts represented by the deputation that it would be a great grievance that the water supply of Liverpool should be drawn from the sources named in the Bill, and they also thought it was a great hardship that they should be called upon to enter into conflict with a large and powerful Corporation like that of Liverpool in order to maintain their interests. He asked Mr. Sclater-Booth, having regard to the important questions involved, and also in view of a National Water Supply, to do what he could to induce the Government to resist the Bill proposed, and to spare the opponents of the scheme an enormous expense—an expense which must be borne in great part by the ratepayers.

The TOWN CLERK of WORCESTER observed that, as far as that city was concerned, the traffic on the river would be injured by the Bill becoming law. If the pure water of the Vyrnwy should be taken by Liverpool, the inhabitants of Worcester would be compelled to have a less pure supply than they had at present, and would probably have to bear the expense of procuring a fresh supply from another source. The supply of water for Liverpool should be taken from a source which would not interfere with trade interests of any magnitude, and which would not affect any large population. Besides, he considered that if Liverpool required more water it could be obtained from Thirlmere, as there was a clause in the Manchester Corporation Water Act of last session providing that Liverpool could get 25 million gallons a day from Thirlmere.

Mr. SCLATER-BOOTH asked whether the clause referred to was a special reservation in regard to Liverpool, or a power generally reserved.

The TOWN CLERK of WORCESTER said it was a general reservation made on behalf of the people of Lancashire.

The MAYOR of WORCESTER urged that by the scheme of the Liverpool Corporation the water supply of Worcester would be greatly diminished and depreciated. It ought, he said, to be remembered that Worcester had spent £70,000 in sewerage and water works, and it would therefore be very hard if the inhabitants of the city were driven to find out a fresh source, which probably would be the case if Liverpool were permitted to take the waters of the Vyrnwy. The Liverpool Corporation had no right to go for water to a watershed which did not belong to them, and he hoped that the scheme would not be tolerated by the Government until a Commission had carefully inquired into the question of a National Water Supply.

Mr. ROBERTSON, M.P. for Shrewsbury, stated that the Corporation of that town were unanimous in their opposition to the Bill, as they were of opinion that it was calculated to injure the interests of Shrewsbury and neighbourhood, especially from a sanitary point of view. Liverpool could get a supply of water from the Dee, which would be more convenient and less costly than obtaining it from the Severn. He submitted, on behalf of the Corporation of Shrewsbury, that Liverpool ought not to be permitted to appropriate to itself so very large a portion of the best waters of the Severn.

Mr. SCLATER-BOOTH asked if any calculation had been made as to the quantity of water to be extracted from the Vyrnwy.

Mr. ROBERTSON replied that it was proposed to take the waters from the Vyrnwy, Marchnant, and Afon Cowny, and to give 8 million gallons a day compensation.

Sir BALDWIN LEIGHTON considered that it was scarcely fair for Liverpool and Manchester, which were practically one district, to monopolize nearly the whole of the gathering-ground of England and Wales.

Mr. WILLIS-BUND, of the Severn Conservancy Board; Mr. WYNN, M.P. for Montgomeryshire; and the TOWN CLERK of CHELTENHAM, also spoke in opposition to the scheme.

Mr. WALTER PIERCE, President of the Liverpool Land and House Owners Association, stated that a large number of property owners in Liverpool were quite in sympathy with the objects of the deputation. He also said that the poll taken in Liverpool, under the Municipal Corporations (Borough Funds) Act did not fairly represent the feelings of the people of the town on the question.

Mr. SCLATER-BOOTH, in reply, said that the subject the deputation had brought before him was, of course, very interesting and most important, and when the project for supplying Liverpool with water from some portions of the sources of the Severn was made known, it was natural that it should excite attention, and perhaps apprehension in some localities. Therefore, he could not wonder that common action should be taken by those represented, with the view of considering whether their interests did not require some united course to be pursued. It was nevertheless true that the needs of a population like Liverpool were very great, and were growing in regard to the first necessary of life. It was thus a duty incumbent upon the Town Council of Liverpool, if they were, as he was informed they were, in urgent need of an additional supply of water, to look in different directions, and it was no new intention to turn southward instead of northward. Still, they were, to a certain extent, in the dark as to the real amount of mischief, if mischief there would be, that would be entailed upon the inhabitants of the Severn Valley. That was one of the difficulties with which they had to contend at present in dealing with this matter. He could not tell what the calculations of the Water Engineers were, and what they proposed to do by the construction of reservoirs on an enormous scale for the purpose of concentrating the supplies. All these matters were very difficult to appraise until the subject had been sifted, and the promoters had the advantage of going into the committee-room with their case more easily proved than perhaps the case of their opponents might be. On the other hand, when he spoke of the wealth and power of the Corporation of Liverpool, he could not help looking round him on those assembled, and they showed ample power to watch and guard the interests of those whom they represented in the different counties through which the Severn, the second great water basin of the country, flowed. The conditions which they had submitted to him as to the use of these waters were of very great weight indeed, and he could not say he thought they would do wisely to assert a right of monopoly to the water of the Severn. No doubt the Liverpool plan differed from the Thirlmere scheme of the Manchester Corporation—a fact which had been unobserved by the Government, and it was one respecting which he need not be reminded. On the other hand, if the Water Engineers could so arrange a plan of this kind as that it would inflict no injury on the persons who were naturally entitled to the use of the waters, and whose needs must certainly have the first claim upon the sources of the Severn, it was hard to say that a place like Liverpool might not be served in respect to the most pressing need of its population. The plan of going to the sources of the Dee was one of very old date, therefore it could not be said the Corporation of Liverpool had sprung a mine upon the country generally in going out of their own district for a supply of water. At the same time it was a question for Parliament and the country whether a plan of this kind should receive sanction or not. He could only promise that the representations which the deputation had made should be submitted to the Government, with a view to consider whether it would be their duty to take any specific action. The natural course was to leave these technical questions to be reported upon by a Committee, and the opponents of a plan like this would have ample means to make their views heard in both Houses of Parliament. He could not doubt that their case would be listened to and attended to, and at all events care would be taken that no injury should be done to the inhabitants of the important towns and districts which they represented. He could not enter further into the matter on this occasion, and he would conclude by saying he should be sorry if it was supposed that the promoters of the plan would not have to submit to a most searching investigation, and be prepared to make clear that if their scheme were sanctioned no injury would follow to the inhabitants of the Severn Valley.

The deputation then withdrew.

ACKWORTH, FEATHERSTONE, PURSTON, AND SHARLSTON GAS COMPANY.—A special meeting of this Company was held on Tuesday, the 3rd inst., for the purpose of confirming a resolution submitted to the Shareholders at a meeting held on the 13th ult., viz.—"That the Bill for incorporating and conferring powers on the Company be approved, subject to such conditions, alterations, and variations as Parliament may think fit to make therein." Mr. A. Wardman was in the chair; and the Secretary (Mr. J. Watson) having read the notice convening the meeting, the necessary confirmatory resolution was, after some discussion, agreed to.

PAINTER'S PATENT HYDROSTATIC PIPE-JOINT.

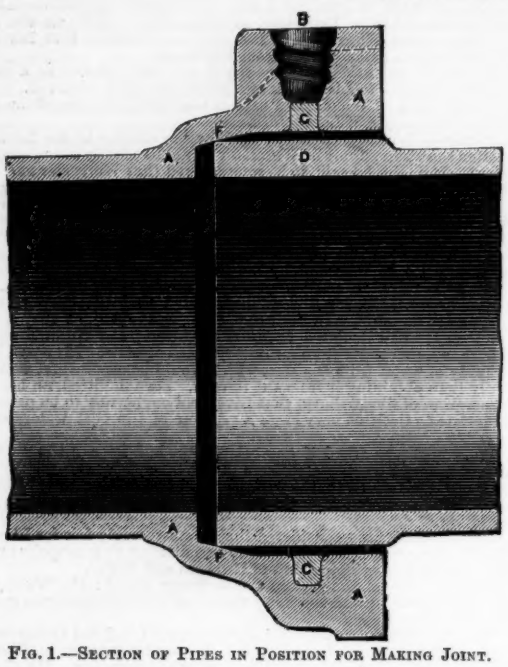

FIG. 1.—SECTION OF PIPES IN POSITION FOR MAKING JOINT.

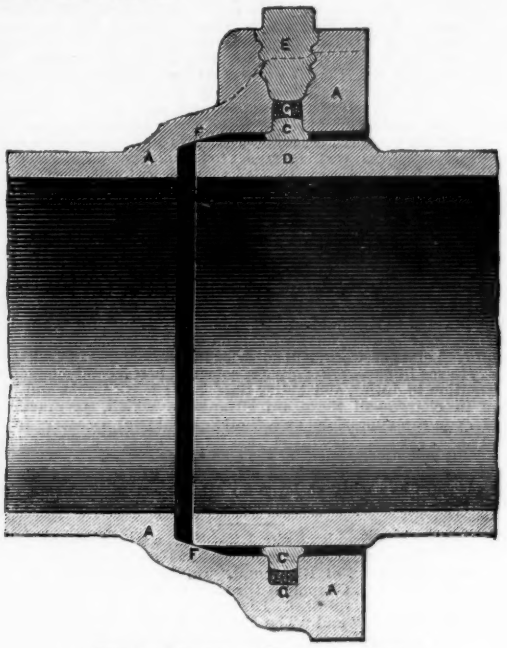

FIG. 2.—SECTION OF JOINT COMPLETED.

We desire to call the attention of those in charge of gas and water works to the novel and scientific invention illustrated above, and which promises to be of great service in general practice.

The improved joint is made by caulking a lead ring between the spigot and socket of the pipe, by means of hydrostatic pressure so applied that the ring is subjected to a uniform pressure at all points of the circumference, thus leaving no room for imperfect work. When we add that the operation is performed without heat, that any unskilled labourer can make the joints faster than the pipes can be laid in position, that the joints can be made under water with equal certainty, and that less than one-third of the usual amount of lead is sufficient, we have, we think, said sufficient to call the critical attention of the profession to the invention.

Fig. 1 is a vertical section of pipes laid in position, and fig. 2 is the same after the joint has been made. A is the socket end of a pipe; and B a screw-hole in the centre of a boss, cast on the part of the pipe laid upwards. This screw-hole is cast upon a chill, and communicates with a groove cast around the inside of the socket. The groove is filled with lead, C, run into place at the foundry before the pipes are sent out. D is the spigot end of a pipe, and being without the usual bead is preferably cast a little thicker for strength. E is a cast-iron plug, also cast in a chill to avoid fitting; and F is a taper shoulder, which guides the spigot into a concentric position. G is the forcing material—a semi-fluid compound of pitch, whiting, and sand, which conveys the pressure to the back of the lead ring from a forcing-jack.

The pipes being laid in position, the labourer screws a small forcing-jack into the hole, B, having previously inserted within the jack enough of the forcing compound, G, to make several joints. By turning the handles of the jack, the semi-fluid forced downwards deflects the lead ring beneath B, and flowing each way around and behind the lead, squeezes it in upon the spigot, and spreading laterally, as it impinges upon the spigot, the lead is caulked so as to prevent any return, or leakage past it. As soon as the lead is firmly seated (which for a 12-inch pipe requires about six or eight minutes), the labourer takes out the jack, puts a little clay in the hole, B, and screws in the cast-iron plug, E, to retain the forcing material, and he is then ready for another joint. The lead ring is simply cast in place by slipping an expanding ring, covered with felt, within the socket, and pouring the molten lead through the hole, B.

It will be seen that the invention is based upon the law of the flow of solids, as in the case of drawing lead pipes, and squirting bullet-rods.

The joint has, it is stated, been tested under a pressure of 1000 lbs. per square inch, and afterwards the pipe was deflected to a considerable angle by a sledge hammer, without causing leakage. In fact, settlement of the ground after the pipes have been laid makes the joint tighter by the lead ring forming a slight ellipse upon the pipe,

We have seen copies of several testimonials in favour of the joint from engineers of repute in the United States, where it appears to be giving satisfaction. The invention is in the hands of Mr. J. S. Fairfax, of 1, Queen Victoria Street, E.C.

A NEW METAL COMPOUND SUITABLE FOR PIPE-JOINTS.

At the Meeting of the Society of Arts last Wednesday, a paper on "A New Metallic Compound, and its Application to Industrial and Artistic Purposes," was read by Mr. GRANVILLE COLE, Ph.D. Omitting those parts which had special reference to the uses of the new compound for artistic purposes, the paper was as follows:—

The subject of my paper is the discovery of what I shall prove to you is a new metallic compound, and I shall endeavour to set forth a few facts, attested by experiments, in respect to its nature. In the first place it will be right to give a brief account of the discovery of the metal.

Nearly a year ago, Mr. J. Berger Spence discovered that the sulphides of metals combined with molten sulphur form a liquid. This liquid, on cooling, becomes a solid, homogeneous mass, possessing great tenacity, and having a peculiar dark grey, almost black colour. Nearly every metallic sulphide which is known combines, as experiments have proved, with an excess of sulphur, and, curiously, nearly all these combinations have the same properties.

Examining the metal from a chemical point of view, I may state, briefly, that it is a chemical compound belonging to that class known as thiates or sulphur sulphides.

Dr. Hodgkinson, Chemical Demonstrator at the Science Schools, South Kensington, has kindly sent me the following facts. I cannot do better than quote his letter on the subject:—

It appears to be the easiest thing in the world to obtain a homogeneous casting with it. Specific gravities of portion sent gave 3·3743 to 3·7036 (reduced to 0° C.)

When finely powdered, it is acted upon slowly by concentrated HCl. and NO_3HO in the cold. In large lumps, little or no action takes place. As yet I have not been able to determine the expansion equivalent accurately; it would appear, however, to be small. The fracture is not conchoidal, as might perhaps have been expected, but somewhat like that of cast iron,

I have not had time to try many "utilization experiments" on the substance, but I have no doubt it would be exceedingly useful in the laboratory even; for instance, for making the air-tight connections between glass tubes by means of choutchouc, and a water or mercury jacket, where rigidity is no disadvantage. The fusing point is so convenient, about 340°, that it may be run into the outer tube on to the choutchouc, which it grips, on cooling, like a vice, and makes perfectly tight.

I do not know what you may call the material, but should think, as it seems to be more than a mere mixture, "ferric thiate" would not be a bad or inappropriate name.

I will now give a short summary of the metal's peculiarities, and advantages over those of other metals or metallic compounds.

1. It has a comparatively low melting point—viz., 320° Fahr., or rather more than 100° above the temperature of boiling water. Here, then, we have in its favour the small amount of fuel needful to supply the necessary heat for reducing the metal to a condition for use.

2. It expands on cooling—a property not shared by the majority of other metals or metallic compounds. I believe that type metal and bismuth are two exceptions. Later on, I think I shall convince you that for an operation like the joining of gas and water pipes this expanding property is one of great importance.

3. It claims to resist atmospheric or climatic influences.

4. As compared with other metals or metallic compounds, its resistance of acids, used commercially, of alkalies, and water, is certainly superior.

5. As compared with lead, which is one of the cheapest of metals, it is one-third the weight; and whereas the average cost of lead for the last ten years has been nearly £18 a ton, Spence's metal only costs £15. A ton of Spence's metal being three times the amount in bulk of that of a ton of lead, it is available for three times the amount of work. It may, therefore, be considered to be nearly a quarter of the price of lead.

As to the uses to which this metal may be applied for industrial purposes, I propose to divide these purposes under three heads:—1. Gas and water works. 2. Chemical works. 3. Miscellaneous.

As practice is better than theory, I will simply relate, as best I can, those experiments which have been tried at the South Metropolitan Gas-Works. Experiments, under the direction of Mr. Livesey, were made some weeks back; and two pipes were joined by the metal in much less time than would have been taken had lead been employed. The pipes, after having been joined, were tested under pressure, but no leakage was found.

In order to show the especial advantages the metal has over lead, it would be as well here if I endeavour to tell you how gas or water pipes are joined when lead is used. The pipes having been laid together, the joint is packed with yarn; and clay is then laid round the exterior of the joint, and the molten lead is run in. Unfortunately, lead possesses the property of contracting on cooling. The leaden joint has, therefore, to be caulked, or, as it is called in the North, staved. This caulking, or staving, means wedging the lead in, so as to obtain a perfectly tight joint; and it naturally occupies considerable time, and necessitates excavation, in order to allow the men to work all round the pipes.

Excavation and caulking are both rendered unnecessary by the use of Spence's metal. The pipes have only to be laid together, and after the yarn has been forced into the joint and the clay placed, the liquid metal is run in, the clay is removed, and the joint is finished. The metal does not splash in running into the mould, thus avoiding a great source of waste of material and danger to workmen.

Experiments were also tried to test the metal joints in the event of subsidence of the ground. Four lengths of 9-feet piping, 6 inches diameter, were joined with the metal, and supported on trestles. After the metal had set, which it did in a few minutes, the centre supports were knocked away, leaving only the two end ones. The 36-feet length of piping sank 7 inches, without showing a leakage, even after pressure.

These experiments were so satisfactory, that the South Metropolitan Gas Company have adopted the metal, and are now laying their pipes with it. Mr. Livesey, the Chief Engineer, in writing on the subject to Mr. Spence, says: "We have now only the test of time, and that, I think, we may take the risk of." Others of the London gas-works, and a very large number of provincial gas-works, are adopting it.

In the same way it will be useful for water-works. Mr. Hope, who undertook some experiments in Scotland, reports that at the Edinburgh Water-Works two pipes were joined, and subjected to a pressure of 400 feet of water, which was as much as they could get on, without the joint showing any leakage. This is the greatest pressure which we have as yet been able to put it to, so what it will actually bear I am not at present in a position to say.

From a sanitary point of view, as water has no action on the metal, it would be extremely valuable for cisterns, instead of iron or lead. Being almost a non-conductor of cold, pipes might be lined with it to prevent the water from freezing.

To chemical manufacturers, the metal being less acted upon by acids than any other metals, it may also be of service. I refer especially to sulphuric acid, which is the most extensively used of all acids in commerce. Lead has, up to the present, been used for sulphuric acid tanks. I have myself tested the metal with sulphuric acid, and its action is almost imperceptible. The one objection to the use of the metal in this case is its low fusing point, but when acids have only to be used up to a certain temperature, say 200° Fahr., I venture to predict a large field for its use.

Besides the uses I have thus briefly set before you, there are many others to which the metal may be applied; for instance, joining iron to stone or wood, the tensile strain of the metal being from 650 lbs. to the square inch five minutes after setting. For joining railings to stone it would answer equally as well as lead, and be very much less in cost; also for coating the holds of ships. I have been told that an Act of Parliament has been passed by which builders are compelled, if the district surveyors desire, to cover the walls of houses, after they are built, two feet out of the ground with some material to prevent the damp from rising. It seems to me that Spence's metal is peculiarly adapted for this purpose; and I may state that experiments on a large scale are still being carried on at Mr. Spence's works, Belvedere, Kent.

I feel sure we have not yet come to the end of all the uses this Spence's metal may be put to, but I trust that I have shown you sufficient to induce you and others who may be interested in this discovery to make further investigations. If my paper is somewhat shorter than is usual, it is to some extent owing to my hesitation to make any statement which either Mr. Spence or I have not verified by actual experiment ourselves. In conclusion, I express a hope that I have established the proposition with which I started, and I trust you are satisfied that this Spence's metal is a discovery which has a prospect of much utility to the fine and industrial arts, and that I have been justified in bringing it before the attention of the members of the Society.

In the course of the discussion which followed,

The Chairman said Dr. Cole had certainly proved that there was in one way or other a very large field for the employment of this new metal. It was very curious to see how an invention, first made with a particular object, sometimes took afterwards an entirely different direction. This material was first brought forward as affording admirable reproductions of works of art, and now they were informed that it was already in profitable use for joining gas and water pipes, and that for this purpose it possessed considerable advantages, not merely because lead required wedging in, in order to make a tight joint, but very often, from the difficulty of getting at the under side of the joint, it was imperfectly accomplished; whereas this new metal, from its fluidity, penetrated all round, and so made a good piece of work of it.

The Secretary narrated the tests to which he had subjected the specimens sent him by Dr. Cole. He said that at anything under about 320° Fahr. it was pasty, and if the temperature went much beyond that it became pasty again, but between 320° and 350° it was perfectly liquid. He thought it rather a pity that a better name had not been devised for the material, as it was certainly not a metal.

Mr. George Livesey said he had had some experience in regard to joining gas-pipes, and he would state the result. Lead, though it was almost universally used, was most unsuitable for this purpose in some respects. It was expensive; it required caulking or setting up to make it tight, because it contracted in cooling; and, if it was necessary to remove the pipes—which constantly happened, except in the very largest mains—from the increased consumption requiring larger pipes, the use of lead prevented the pipes being lifted without cutting them, and this occasioned considerable loss. Various means had been tried for drawing pipes, but all had failed, and they always had to be cut. Another drawback was that lead, being valuable and easily disposed of, was constantly being stolen. This new metal, however, was free from all these disadvantages; and it had many advantages for main-laying purposes, not the least of which was its perfect soundness. The account given by Dr. Cole was quite accurate. The four pipes jointed at his (Mr. Livesey's) works in the Old Kent Road, as described, and supported at the two ends, were exposed to the most severe test, and when he purposely broke one of the joints at the conclusion of the experiment to see what the effect was, he found the metal had taken a perfect impression of the cast iron. The South Metropolitan Gas Company were now using it instead of lead; the men had no difficulty in applying it; and the only test required was that of time, of which he had no fear. The only possible difficulty was that the workmen, being accustomed to use a fierce fire to melt lead when used, might make the metal too hot, and so burn the sulphur in it; but this could easily be guarded against. If required, the metal compound could be easily cut out with a chisel in order to remove the pipes; and another advantage was, that if from any cause it did not run quite round a large pipe and make a perfect joint, the part which had not been filled could be cleaned out, a fresh piece of clay put there, and the place filled up with a little more metal, and thus the joint was made quite sound.

Mr. Cresswell wished to know, in the first place, if this material, when used for jointing pipes, possessed any elasticity, because he was told that it was absolutely essential to the permanence of gas-pipes under the London streets, with heavy traffic continually passing over them, that there should be a certain give and take, or elasticity in the joints. If, when heavy pressure was brought to bear on the pipes, they gave way at the joints, the value of the joints was reduced to *nil*. In the ordinary way, the pipes were first caulked, then the joint was filled with lead, and the lead caulked, and thus an elastic joint was produced which would yield to such an extent that the pipe might be bent without destroying the continuity of the joint. If, on the other hand, this metal was so brittle that under any sudden pressure it gave way, it would be a formidable difficulty. The next question was this. He understood there was a project for bringing water to London from the sea, and one of the greatest difficulties, as he was informed, which the promoters would have to deal with, was to discover a joint for the pipes which would not be affected by salt water. If any means could be devised for cementing pipes which would allow of salt water being conveyed from Worthing to London, and remaining in the pipes for 48 hours or more, or even permanently, it would relieve the promoters of the enterprise of a great difficulty, and perhaps confer a great boon on the inhabitants of the Metropolis.

Mr. Waller asked if the compound would expand and contract in the same proportion as water-pipes, if used for joints for hot water.

Mr. Spence said the joints would be considerably affected by hot water if the temperature were very high. Ordinary boiling water would not affect the compound; but, as it melted at about 300°, if there were a steam pressure of about 40 lbs. there would be such an increase of temperature that the joints would not stand. It did possess a certain degree of elasticity. In one case, 30 feet of pipes were connected with this metal at the joints, and deflected to the extent of 8 inches, and, when the weight was removed, the pipes recovered their original position, showing that it was elastic to some extent. With regard to expansion and contraction he was hardly yet in a position to speak. He would take this opportunity of stating that if ever the metal compound, as it was called, did take a place in art or industry, much of its success would be due to Dr. Cole, who had greatly assisted him in his experiments, and in elucidating the facts; and also to Mr. Livesey, who was the first to take it up in a practical way.

Mr. Livesey said lead was certainly not elastic. If four lengths of 9-feet pipes were joined together with it, caulking it up in the ordinary way, and the central supports were knocked out, the upper part of the joints would squeeze into a narrower compass, and the lower would be left open, and when the pipes were again brought to a straight line, the lead would not return to its original shape. Lead was not elastic in any sense whatever, and it was, therefore, a very bad thing for pipe-joints, where there was any settlement or change of position. This new metal seemed to have the effect of making the four lengths into one continuous, perfect pipe, which had just the same strength in the joints as anywhere else. This was shown by the fact that when supported at the two ends it sagged evenly throughout, making a continuous curve; whereas if the joints had been made with lead, there would have been a number of straight lines, with angles at the joints.

Dr. Cole, in answer to Mr. Cresswell, said he believed that salt water would have no action on the metal whatever.

A vote of thanks to Dr. Cole terminated the proceedings.

TECHNOLOGICAL EXAMINATIONS.

The City and Guilds of London Institute for the Advancement of Technical Education have just issued a revised edition of the programme for their technological examinations, which are to be held in May next, at different local centres throughout the country, as notified in the Journal for Sept. 30 last year, p. 511. Among the additions, which appear for the first time in the second edition, is a notification that an examination on "Fuel" will be held. The examiner will be Professor Edmund J. Mills, D.Sc., F.R.S.; and the examination will include questions founded on such subjects as the following, but will not necessarily be confined to those subjects:—

1. Nature and mode of propagation of flame.
2. Conditions of perfect and economical combustion. Forms of burners, stoves, and furnaces.
3. Calorimetry. Calorific value and calorific intensity of any combustible or mixture of combustibles.
4. Properties and treatment of wood, "charbon roux," and charcoal. Comparison of the "oven" and "stack" processes.
5. General consideration of the transition from cellulose (and its allies) to carbon.
6. Preparation and properties of peat. Various methods of drying peat, and apparatus therefor. Economics of peat. Peat charcoal.
7. Lignites and their uses.
8. The different varieties of coal. Coke, as prepared both by the "oven" and "stack" methods.
9. Coal gas as a fuel. The regenerative furnace.
10. Anthracite.
11. Cereals, petroleum, patent fuel, and other minor fuels.

For the full Technological Certificate, the candidate will be required to have passed at least in the elementary stage of one of the following science subjects:—Machine Construction and Drawing; Applied Mechanics; Acoustics, Light, and Heat; Organic Chemistry; Geology; Metallurgy; Steam.

THE LANCASHIRE COAL AND IRON TRADES.

(FROM OUR OWN CORRESPONDENT.)

The coal trade of this district continues in a depressed condition, and there is no improvement since last week. The better classes of round coal are becoming more difficult to move, and owners in many cases are not able to keep their best coal collieries going full time. I have heard of one or two inquiries coming into the market for gas coal, and it would certainly seem prudent on the part of consumers who have requirements to cover to take advantage of the present state of the market. As I pointed out last week, there is a probability of the better classes of round coal being very plentiful during the summer, and low in price; but, although the quantity of the lower classes of round coal going into consumption for manufacturing purposes is still considerably below the means of production, there is everywhere in the iron trade—which, of course, is the principal consumer—a feeling of confidence with regard to the future; and, should the demand from this branch of industry increase to any large extent, it would naturally tend to harden the market generally. At the present time there is a weakness in round coals, as well as an abundance of supplies in the market, which might induce the holders in some cases to sell forward for the purpose of securing orders, and I have heard of a few instances where this is being done, although generally some advance upon present rates is asked for anything like extended deliveries. The prices now ruling for round coal at the pit mouth are about as under:—Good qualities of Wigan Arley, 8s. to 8s. 6d. per ton; inferior sorts, 6s. 6d. to 7s.; Pemberton four-feet about the same price; common round coals, suitable for house-fire purposes, are fetching about 6s., whilst steam and forge coal can be bought at from 5s. 3d. to 5s. 9d. per ton. With regard to slack, there seems to be generally rather a better feeling in the market. The requirements of consumers of this class of fuel are decidedly on the increase, and there is every probability of a much larger demand, which is bringing a good many inquiries into the market for forward contracts. This is causing colliery proprietors to hold more firmly than they have been doing, although the prices at present obtainable are no higher; good slack at the pit mouth ranging from 2s. 9d. to 3s. 3d., and common sorts from 2s. 3d. to 2s. 6d. per ton.

In the iron trade there has been, if anything, a rather better tone, and although there is still underselling on the part of merchants, second-hand lots of outside iron have scarcely been offered at such low figures as last week. A fair demand for shipment is maintained, and a good deal of activity is being looked forward to when the spring shipping season opens. For Lancashire pig iron delivered into the Manchester district quotations remain at about 70s. per ton, less 2½ per cent. Makers of finished iron are very firm, and very little iron can at present be obtained except through merchants. Lancashire bars delivered into the Manchester district are quoted at about £9 to £9 10s., and hoops at about £10 10s. per ton.

THE COAL AND GENERAL TRADES OF THE NORTH OF ENGLAND.

(FROM OUR OWN CORRESPONDENT.)

The best Durham gas collieries are kept fully employed. Some more contracting was done last week. Prices continue at the same rate. We

are within a fortnight of the reopening of the Baltic trade, when very numerous cargoes of gas coals will be shipped for various parts of the world. The demand for steam tonnage to carry coals, especially gas, over sea is increasing. A lot of a good sort of second-class gas coals has been sold under contract, and will be sent abroad during the ensuing season. The shipments of gas coal coastwise were again very much held in check last week through the continued prevalence of fogs in the North Sea, in the lower reaches of the Thames, and upon the south-eastern coast.

Large contracts have been made for the shipment of best steam coals. But the advance in prices has not been so great as the coalowners anticipated. Small and manufacturing coals keep their position in the market. The demand for coke is fully upheld. Large quantities, sold under contract, are sent away to the blast furnaces, not only in the Tyne, Tees, and Durham district, but to the north-west of the island. The price of Morley Hill Durham coke, a quality much used for shipment to Spain, is 19s. a ton, f.o.b. The coasting trade is dull; 6s. per ton being paid a steamer to load gas coals for Cork on Friday. Low rates were paid all last week to sailing ships to load coals for the English Channel ports and the North of France. There has been rather an excess of sailing tonnage. Captains have been anxious to make another coasting voyage before the Baltic opens, and they have put too many ships into the market. Rates have been lower by about 6d. per ton. Several sailing ships and steamers were chartered last week to load gas coals for the Baltic.

The markets in the Cleveland iron district were rather flat last week. The price of crude iron could hardly be upheld. There is a great demand for manufactured iron. The foundries are very busy making large castings, and gas and water pipe-making is kept back.

The chemical market is quiet.

The demand for all the better qualities of fire-bricks is very fully maintained.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

At a meeting of the Directors of the Inverurie Gas Company, held a few days ago, it was resolved to reduce the price of gas from 8s. 4d. to 7s. 11d. per 1000 cubic feet.

Chief Magistrate M'Farlane, presiding at a meeting of the Police Commissioners of Coupar Angus, on Monday, the 9th inst., gave notice of a motion to the effect that the Commissioners should take the gas supply undertaking of the burgh into their own hands.

In connection with the proposed improvement and extension of the gas-works at Broughty, the Gas Committee held a meeting on Monday of last week, when they inspected the works and plans proposed by Mr. Henderson, Gas Engineer, of Leven, and considered certain suggestions made by the Manager and Convener; and they subsequently agreed to proceed to Kirkcaldy and Forfar in order to ascertain the general state of the works at those places, and more especially the working of the scrubbers, as also the general condition in which those works were kept in comparison with the works at Broughty Ferry.

The question of bad debts by gas consumers was up for consideration at the last monthly meeting of the Gas Corporation of Dumbarton. But according to a statement from the Manager, Mr. J. M'Gilchrist, there were really none to report, not even a single penny of bad debts for the six months ending November, 1879. That fact speaks volumes in favour of the deposit system advocated by Mr. M'Gilchrist in the paper he read before the West of Scotland Association of Gas Managers, at the meeting held at Kilmarnock in the autumn of 1878. The bad debts in connection with the gas undertaking in Dumbarton are perhaps less than those of any other town in the United Kingdom. For the past two years they have been less than 1s. 4d. per £100 collected.

The Cleaning and Lighting Committee of the Town Council of Edinburgh had under consideration at a recent meeting a proposal to introduce larger lights into the lamps in Princes Street, with the view of improving the lighting of that important thoroughfare. After full consideration of the subject, however, the Committee arrived at the conclusion that an experiment should be made in the city with the electric light, and for this purpose it was resolved to recommend the Council, at its next meeting, to authorize the Committee to make the necessary arrangements for testing the electric light in Princes Street, on Waverley Bridge, and on North Bridge.

A visit was recently made by the members of the Town Council of Port Glasgow and a number of the leading town officials to the new water reservoir at Auchendoors, now nearly completed, which will give an additional storeage of 90 million gallons, being more than double the present supply, without taking into consideration the new works recently completed at Dougliehill. The water was turned into the new reservoir on the day of the inspection.

A long discussion took place on the water question at the last meeting of the Hawick Town Council, and a motion to enlarge the present reservoir and re-arrange the town main-pipes was lost by 10 votes to 4. Provost Watson spoke strongly in favour of the new scheme reported on by Messrs. Leslie, Edinburgh, to cost about £15,000, and give an additional supply of some 600,000 gallons a day. The present supply is upwards of 300,000 gallons for about 15,000 of population. The Provost gave notice of motion accordingly.

Mr. J. M. Gale, C.E., Glasgow, has been requested by the Water Commissioners of Dumfries to visit that town, for the purpose of examining the whole water supply system with a view to a better distribution and the prevention of waste. Plans by the same gentleman for obtaining a supply of water for the burgh of Annan from Middlebie Burn, about nine miles from the town, have just been submitted to the Police Commissioners of the burgh.

The Glasgow pig iron warrant market was much more regular last week than in the two preceding weeks, and a large amount of business was done daily. As high as 70s. 1½d. cash was paid on Friday afternoon.

The coal market was dull during the past week, and the coalmasters had difficulty in keeping their pits going full time. Prices are a shade easier all round.

PENISTONE LOCAL BOARD WATER SUPPLY.—The Penistone Local Board have commenced their water supply operations by making a reservoir at Cross Royd Head. The first sod of the new reservoir was cut on Tuesday last.

THE PURCHASE OF THE CONWAY GAS-WORKS BY THE TOWN COUNCIL.—Last Tuesday, Major Tulloch, R.E., on behalf of the Local Government Board, held an inquiry, at Conway, as to the application of the Town Council for a Provisional Order empowering them to purchase the local gas-works. There was no opposition to the proposal.

DORCHESTER GAS COMPANY.—The half-yearly meeting of this Company was held last week—Mr. Henry Lock in the chair—when permission was asked of the Shareholders to borrow £5000 extra capital. A dividend of 10 per cent. was recommended, and the report of the Directors was unanimously adopted.

WINCHESTER GAS AND WATER COMPANY.—We hear that the Directors of this Company resolved at a recent meeting to recommend to the Shareholders that a further reduction of 3d. per 1000 feet should be made in the price of gas at and from Midsummer next. This will be the third reduction during the last five years.

AIREDALE GAS COMPANY.—The ordinary half-yearly meeting of this Company was held on Monday, the 9th inst.—Mr. Robert Sutcliffe in the chair. The works were declared to be in a satisfactory condition, and a dividend at the rate of 10 per cent. per annum was declared. Mr. Sutcliffe was re-elected Chairman of the Company, and Mr. Bland Vice-Chairman.

SALE OF SHARES IN THE OSSETT AND MIRFIELD GAS COMPANIES.—At a recent sale by auction at Wakefield, 12 £5 original shares (fully paid) in the Ossett Gas Company were sold for £12 12s. 6d. each; a second lot, consisting of 16 similar shares, selling at the same price. Twelve £5 shares (7 per cent.) in the same Company realized £8 10s. each, and 86 £5 shares (fully paid) in the Mirfield Gas Company, £10 15s. each.

SALE OF FOLKESTONE GAS AND WATER COMPANIES SHARES.—Last Wednesday there were sold by auction some shares in the above-named Companies, with the following result:—£10 paid-up original shares in the Folkestone Gas and Coke Company sold at an average price of £21—a few fetched £21 2s. 6d.; new shares, £15 each. Shares in the Folkestone Water-Works Company, £10 paid up, sold the majority for £20 per share, whilst some others fetched £20 7s. 6d. and £20 10s. per share.

THE GAS SUPPLY OF TRING.—An agitation has been started against the quality and price of gas at Tring, and two public meetings on the subject have been held. The first was on Thursday, the 22nd of January, when a Committee of five was appointed to draw up a protest and memorial for signature and presentation to the Company. These were submitted at the adjourned meeting the following Thursday, and unanimously approved of. The memorial—which, among other things, asks for a reduction in the price of gas from 5s. 10d. to 4s. 6d. per 1000 feet—was directed to be sent to the Directors of the Company. We have not yet heard their decision in the matter.

SALE OF SHARES IN THE BARNSLEY GAS COMPANY.—On Wednesday last a number of shares in the Barnsley Gaslight Company were submitted to auction by Messrs. Lancaster and Sons. Lots 1 and 2, consisting of £100 and £200 original stock, were sold for £201 15s. per £100. Four E shares, paying 7 per cent., and four F shares, paying 10 per cent., were sold for £108. Lot 4, £100 original stock, paying 10 per cent., were sold for £202 10s., and £200 original stock was sold for £202 10s. £354 of original stock realized £202 per £100. Lots 7 and 8, £100 and £166 4s. 6d., were purchased for £201 per £100. The four following lots—viz., 17 C shares, 13 D shares, 20 D shares, and 17 E shares—realized similar prices.

BUCHAREST GAS COMPANY.—This Company has been recently started for working the concession granted by the Municipality of Bucharest for lighting the city. It is for 40 years, and was granted on March 26, 1868, on certain conditions which were modified in May, 1870. The Company propose to work any additional concessions they may acquire for the lighting of other places, and their operations are to include the sale of coal, coke, and the residuals of gas-making, or the manufacture of chemical products therefrom. The capital of the Company is to be 6,000,000 frs. (£240,000), divided into 12,000 shares of 500 frs. each. The business of the Company is to be managed by a Board, consisting of not less than five nor more than nine Directors, who are to be appointed in general meeting. The offices of the Company are in Paris.

GENERAL GAS ASSOCIATION FOR FRANCE AND ABROAD.—A limited liability company has just been started with the above title, for the purpose of obtaining, in France and elsewhere, concessions and undertakings relative to public or private lighting and heating by gas, or any other method, and of conducting all financial, commercial, and industrial operations in connection therewith. The Association also propose to undertake the supply of water in such places as they may light with gas. The capital of the Association is to be 20,000,000 frs. (£800,000), in 40,000 shares of 500 frs. (£20), and the business will be conducted by a Board of not less than five nor more than fifteen Directors, who are, as usual, to be appointed at a general meeting of the Shareholders. The offices of the Association are in Paris.

RATHMINES WATER SUPPLY.—On Thursday, the 5th inst., a special meeting of the Commissioners of the township of Rathmines and Rathgar was held to consider a letter from the Water-Works Committee of the Dublin Corporation, renewing the offer of a supply from the Vartry source of one million gallons per day delivered at high pressure within the township, with a head of pressure sufficient to carry the water considerably above the highest house in the township, at a rental of £3000 per annum, the Corporation to take the necessary steps for the introduction of the supply. An additional supply of half a million gallons, if the Commissioners should require it, was offered at 1½d. per 1000 gallons. After a long discussion a division was taken, which resulted in the loss, by 11 votes to 5, of the resolution authorizing the reopening of negotiations with the Corporation on the subject.

THE ELECTRIC LIGHT IN PARIS.—It will be remembered that early last year the Municipal Council of Paris authorized a preliminary trial of the electric light for the public illumination of the city. The places selected for the trial were the Avenue de l'Opéra, the Place du Théâtre Français, the Place de la Bastille, and one of the pavilions of the Halles Centrales. The experiment was to extend over one year, from the 15th of January, 1879. Authority was at the same time given to the Paris Gas Company to light by an improved system, for a similar period, the Rue du Quatre Septembre, the Place du Château d'Eau, and one of the pavilions of the Halles Centrales. The term authorized expired on the 15th ult., but the Council have resolved to continue the electric light in the Avenue de l'Opéra and the Halles Centrales until the 1st prox. In the Place de la Bastille, however, gas lighting will be again adopted as soon as the necessary arrangements can be made for its re-establishment.

ADOPTION OF THE AVERAGE METER SYSTEM FOR THE PUBLIC LAMPS AT MORECAMBE.—At the monthly meeting of the Morecambe Local Board last Tuesday, the following report from the Lighting Committee was agreed to:—

> The Lighting Committee appointed by the Local Board on Aug. 12, 1879, to make arrangements for the better lighting of the town, considered it advisable that the Board should become owners of the public lamps, pillars, and brackets, and that the gas to the same be supplied on the average meter system; and with that view, the Committee have been in correspondence with the Directors of the Gas Company, with whom they have made a provisional purchase of the pillar lamps and bracket lamps at £4 and £2 5s. each respectively, and that the gas be supplied on the average meter system, one meter to every twelve lamps, and at 5s. per 1000 cubic feet. The Committee consider the above terms satisfactory, and recommend the same to the Board for their approval.

A resolution to apply to the Local Government Board for their sanction to the borrowing of the necessary money to carry out the proposal was also passed.

CHICHESTER WATER COMPANY.—The half-yearly meeting of this Company was held last Thursday—Mr. W. Smith in the chair. The report which was presented by the Directors congratulated the Shareholders on the progress which continued to be made in the business done by the Company. The receipts from water-rents during the last three half years had

been as follows:—December, 1878, £504 4s. 11d.; June, 1879, £488 12s. 8d.; December, 1879, £553 6s. 8d. The profits for last half year amounted to £427 9s. 7d., which, together with the sum of £345 10s. 6d., the balance of profits carried over from the previous half year, amounted to £773 0s. 1d., out of which a dividend of 4s. 6d. per share was declared on the 21st day of August last. This had been paid, and absorbed £332 2s., leaving a balance of £440 18s. 1d., out of which the Directors recommended that a dividend of 5s. 6d. per share, free of income-tax, on the fully paid-up shares, be declared, making 5 per cent. for the year. Services have been laid on to 28 additional houses. The residue of the shares in the Company have been issued and allotted, in pursuance of the resolution passed at the extraordinary meeting which was held on Oct. 9 last. A call of £2 per share on such shares has been made and paid. This has enabled the Directors to clear off the item of £221 6s. 10d., being the excess of expenditure over the amount of shares issued, as shown in the capital account for last half year, and to purchase a large stock of pipes for the purpose of laying the mains down St. Pancras, as well as for further extensions, including the pipes which will be required for the intended additional main from Westgate to the reservoir. The Directors consider that the Company have been fortunate in having been placed in a position, by the issue of the remainder of the shares, to purchase the pipes while iron was at a very low price. The report was agreed to, the proposed dividend declared, and the retiring Directors were re-elected.

Register of Patents.

APPLICATIONS FOR LETTERS PATENT.

521.—Hulett, D., High Holborn, London, "Improvements in or applicable to apparatus for condensing, washing, and purifying gas and other vapours." Feb. 6, 1880.

533.—Thompson, W. P., High Holborn, London, "Improvements in and appertaining to gas-engines or engines actuated by the explosion or combustion of mixed gas or vapour and air." A communication. Feb. 7, 1880.

545.—Walker, C. C., Lilleshall, Salop, and Walker, W. T., Highgate, London, "Improvements in or connected with the purification of coal gas, and in the apparatus employed therein." Feb. 7, 1880.

561.—Brougham, F. J., Westminster, "Improvements in the method of or arrangements for distributing, igniting, and extinguishing gas for street and other lighting." A communication. Feb. 9, 1880.

569.—Attrill, H. Y., and Farmer, W., New York, U.S.A., "Improvements in the manufacture of gas for heating and illuminating purposes, and in the means and apparatus connected therewith." Feb. 10, 1880.

573.—Haddan, H. J., Westminster, "Improvements in apparatus for closing or emptying water-pipes or other fluid conduits, part of which improvements are applicable generally for shunting electric currents." A communication. Feb. 10, 1880.

591.—Pocock, A. W., Wandsworth, London, "Improvements in meters for measuring liquids." Feb. 10, 1880.

594.—Hopkinson, W. W., Brunswick Square, London, "Improvements in the means or apparatus for controlling the flow of liquids, specially applicable to controlling the supply of combustible liquids for lighting or heating purposes." Feb. 11, 1880.

601.—Adams, J., Glasgow, "Improvements in gas-stoves." Feb. 11, 1880.

619.—Kromschröder, J. F. G., Prince of Wales Road, London, "Improvements in the manufacture of coal gas for lighting purposes." Feb. 12, 1880.

622.—Bright, H., Leamington, Warwick, "Improvements in apparatus for enabling the process of softening hard water to be effected automatically." Feb. 12, 1880.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

3308.—Bamford, G., Bradwell, Derby, "Improvements in valves." Aug. 16, 1879.

3694.—Lake, H. H., Southampton Buildings, London, "Improvements in and relating to apparatus for the manufacture of illuminating gas." A communication. Sept. 15, 1879.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

315.—Dufrené, H. A., "Improvements in burners for mineral and other oil, vapour, and gas." Jan. 25, 1877.

341.—Cotterell, F. J., "An improvement or improvements in sliding gaseliers or gas chandeliers." Jan. 26, 1877.

413.—Hunt, B., "Improvements in pipe-joints." Jan. 31, 1877.

431.—Pope, J., "Improvements in taps or cocks, which improvements are also applicable to regulating the flow of water to water-closets and other like receptacles." Feb. 1, 1877.

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION, TWO MEDALS at the PHILADELPHIA EXHIBITION and TWO MEDALS at the PARIS EXHIBITION, have been AWARDED to GWYNNE & CO. for GAS-EXHAUSTERS, ENGINES, and PUMPS; Also 27 OTHER MEDALS AWARDED at all the GREAT INTERNATIONAL EXHIBITIONS.

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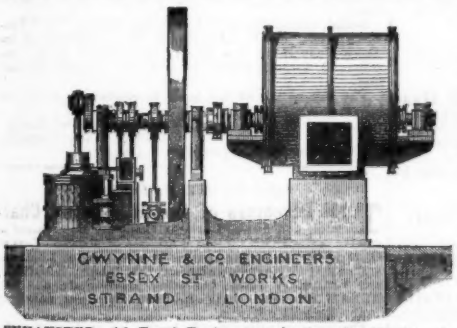
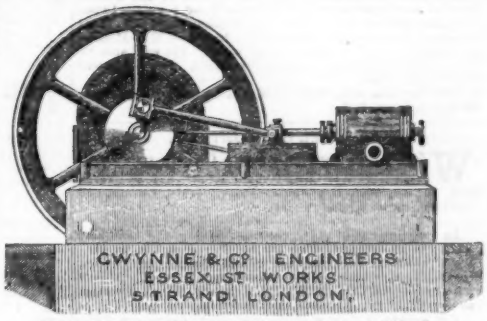


EXHAUSTER with Trunk Engine, capable of passing 210,000 cubic feet per hour.

The Judges report on the combined Exhauster and Steam-Engine exhibited at the Philadelphia Exhibition is—*"Reliable compact Machine, well adapted for the purpose intended, of excellent workmanship."*

GWYNNE & CO. have made the largest and most perfect Gas-Exhausting Machinery in the world, and have completed Exhausters to the extent of 8,000,000 cubic feet passed per hour, of all sizes from 2000 to 210,000 cubic feet per hour.



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GWYNNE & CO. do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, *but to produce machinery of the very highest quality, and most approved design and workmanship.* The result is that in every instance their work is giving the fullest satisfaction. Numerous testimonials and references can be given to Companies using their Machinery for years past.

Exhausters, with or without Engines combined, can be made to pass the gas WITHOUT OSCILLATION OR VARIATION IN PRESSURE Regulators, Bye-Passes, Stop-Valves, Gas-Valves, Station Governors, and Gas Machinery of all Sizes.

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Gwynne & Co.'s New Catalogue on Gas-Exhausting and other Machinery may be obtained on application at the above Address.

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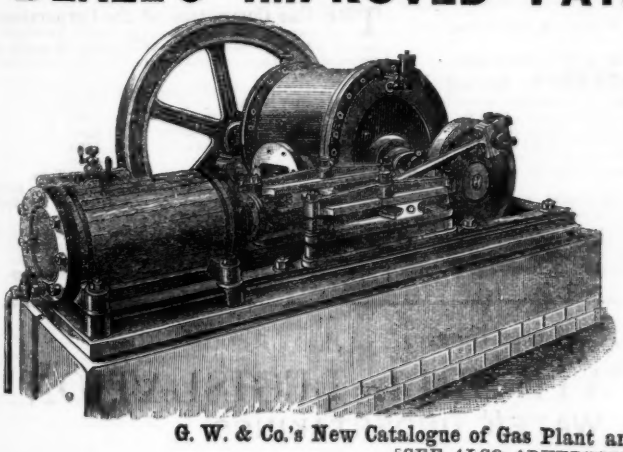

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G. W. & Co.'s New Catalogue of Gas Plant and Machinery can be had on application.

[*SEE ALSO ADVERTISEMENT, PAGE 262.*]

Phœnix Engineering Works:

HOLLAND STREET, SOUTHWARK, S.E.

WANTED, Readers of the NEW Edition, "Cooking & Heating by Gas;" on Burners, &c. Copies, by post, Threepence, direct from the Author, MAGNUS OHREN, Assoc.M.I.C.E., Gas-Works, SYDENHAM.

TO GAS MANAGERS.

WANTED, by a Young Man, aged 25, a Situation as GAS-FITTER, Meter Fixer, Main and Service Layer.
Apply to W. HUCKLE, Gas-Works, Wolverton, BUCKS.

AGENCY.

WANTED, an Agent in Gas Engineering work for the Northern and Midland Counties.
Address, with full particulars, to No. 629, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, for a small Gas-Works in the Country, a MANAGER to Make Gas, Lay Mains and Services, Fix Meters, and take states of same. Wages 25s. a week, with good house and garden, also coals and gas.
Applications, with two recent testimonials, to be made to Mr. BARRATT, Engineer and Manager, Gas-Works, Grantham, on or before the 26th of February.
None but strictly steady and sober men need apply.

TRURO GAS COMPANY.

WANTED, by the above Company, a thoroughly practical Man as a GAS-FITTER. One who understands bronzing and lacquering would be preferred. To a steady and competent man, the situation would be a permanent one.
Applications, enclosing testimonials, with references, and stating wages expected, to be addressed to the Secretary, Mr. J. HAMILTON.
Truro, Feb. 6, 1880.

THE NORTHWICH GASLIGHT AND COKE COMPANY, LIMITED.

WANTED, a Gas Manager. Make 20 millions. Salary £100 per year, with house, coal, gas, water, rates, and taxes free.
Applications, stating age, &c., to be sent in not later than Saturday, March 6, 1880, addressed to the Chairman, sealed and endorsed "Gas Manager."
HENRY PICKERING, Secretary.
Northwich, Feb. 14, 1880.

WANTED, a Man about 30 years of age, accustomed to the Outdoor work of a Gas Company, under the direction of the Engineer. The person appointed must devote his whole time to the duties, and be able to command men. He will be required to act as Foreman over at least 15 lamplighters. He must thoroughly understand Taking the Index of Gas-Meters, at which he will be required to assist. He will also be expected to make himself generally useful. The wages will be 30s. per week.
Address No. 628, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

ARUNDEL GAS COMPANY.

WANTED, by the above Company Four Good PURIFIERS (second hand), not to exceed 8 ft. square, with Dry Centre-Valve, Grids, Covers, and Lifting Gear complete.

In consequence of enlargement of Works, the Company have for DISPOSAL Two Double Purifiers, 8 ft. by 4 ft., with Two 6-in. Four-way Valves and Connections; Wood Sieves, Covers, and Lifting Gear, nearly new. Also a STATION-METER 2000 ft. per hour; 4-inch Connections; Clock and Tell-tale arrangements.
Particulars, including price, and where to be seen, to be sent to W. C. Dawson, Manager, Gas-Works, Arundel.
By order,
RICHARD HOLMES, Secretary.
Arundel, Feb. 6, 1880.

Assistant Draughtsman required, well up in Working Drawings, and who can take out Quantities.
State age, previous engagements, references, and remuneration expected, to D. O., Messrs. Cutler and Sons, Girder and Bridge Works, Millwall, LONDON, E.

OLD SWINDON GAS COMPANY.

NOTICE is hereby given that the services of William Barrett Swaine, late Secretary and Manager of this Company, terminated on the 31st of January last, and the said William Barrett Swaine holds no authority to receive any money due to the Company, or to give any orders or directions for or on behalf of such Company.
W. J. CANNING, Secretary and Manager.
Gas-Works, Feb. 11, 1880.

FOR SALE—One Vertical Condenser, consisting of Bottom Box 21 ft. long by 20 in. by 16 in., Fourteen 10-in. Pipes, and Seven 10-in. Bends.
Apply to Mr. S. STUDHOLME, WHITEHAVEN.

GAS COKE.

A LARGE QUANTITY required for delivery over a period of nine months.
Address, with price per ton into trucks at railway station, to G. J. EVERSON, Gas, Coal, and Cannel Contractor, BIRMINGHAM.

FOR SALE—A Set of Four Purifiers, each 18 ft. long by 8½ ft. wide, and 6 ft. deep, with Centre-Valve and 12-in. Connections complete.
Parted with as being too small.
Offers to be addressed to the MANAGER, Edinburgh and Leith Gas Company, Baltic Street, LEITH.

GAS AND WATER SHARES.

FOR SALE—A few Ordinary £10 Shares, fully paid, in the Chesterfield Water-Works and Gaslight Company. The Shares are entitled to a maximum dividend of 7 per cent. per annum, and the selling price includes the half year's dividend at that rate which will be declared at the general meeting to be held this month. Price £13 per share.
Address the Executors of J. G., deceased, 5, Knifesmith Gate, CHESTERFIELD.

NOTICE TO MANAGERS OF GAS COMPANIES.

THE LAW UNION FIRE AND LIFE INSURANCE COMPANY, of No. 126, Chancery Lane, London, grants Policies of Insurance on Gas-Works, and Buildings connected therewith, which cover risk of explosion and spontaneous ignition of Coal, on very advantageous terms. Full particulars will be sent post free on application to
FRANK M'GEDY, Secretary.
126, Chancery Lane, London.

GASHOLDER FOR SALE.

THE Forfar Gas Corporation have for SALE a Single-Lift GASHOLDER, 60 ft. diameter by 18 ft. deep, with six tripod Columns and wrought-iron Girders, now in working, but must be removed between the 1st and 31st of May next.
Further particulars on application to the Manager at the Works.
Tenders received by Mr. WILLIAM GORDON, Solicitor, Clerk to the Commissioners, on or before March 31, 1880.
Forfar, Feb. 11, 1880.

TENDERS WANTED.

THE Forfar Gas Corporation is prepared to receive TENDERS for the following Works:—
First. The Furnishing and Erection at the Gas-Works, Forfar, of a Telescopic Gasholder, in Two Lifts, each 18 ft. deep—Outer Lift, 60 ft., and Inner Lift, 58 ft. 3 in. in diameter.
Second. The Converting of the present 60 ft. Single-Lift Gasholder into a Telescopic Gasholder of Two Lifts, the Inner Lift being 58 ft. 3 in. in diameter and 18 ft. deep.
The plans and specifications will be seen in the hands of the Manager at the Works, and sealed tenders, marked "Tender for Gasholders," must be lodged with Mr. WILLIAM GORDON, Solicitor, FORFAR, Clerk to the said Corporation, on or before the 21st day of February, 1880.
The lowest or any tender may not be accepted.
Corporation Gas-Works, Forfar, Jan. 28, 1880.

TO TAR DISTILLERS.

THE Directors of the Wakefield Gaslight Company are prepared to receive TENDERS for the Purchase of the Surplus TAR made at their Works, for the period of Fifteen months expiring the 30th of June 1881. Approximate quantity, 900 tons.
Sealed Tenders, endorsed "Tar Tender," to be sent in not later than the 21st of February next.
By order,
JOHN W. WHITAKER, Manager and Secretary.
Gas Office, Feb. 2, 1880.

RAMSGATE IMPROVEMENT COMMISSIONERS—GAS AND WATER DEPARTMENT.

THE Gas and Water Committee invite TENDERS for about 60 Tons of SULPHURIC ACID, delivery to extend over Twelve months.
The Committee do not bind themselves to accept the lowest or any tender, which should be sent in not later than 2 p.m. on the 26th of February, addressed to the Chairman.
Particulars on application to
WILLIAM A. VALON, Engineer.

RAMSGATE IMPROVEMENT COMMISSIONERS—GAS AND WATER DEPARTMENT.

THE Gas and Water Committee invite TENDERS for about 490 ft. of Machine-made CLAY RETORTS, particulars of which may be obtained on application.
The Committee do not bind themselves to accept the lowest or any tender, which should be sent in not later than 2 p.m. on the 26th of February, addressed to the Chairman.
WILLIAM A. VALON, Engineer.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.
Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.
Patents procured for Foreign Countries.
Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 22, Great George Street, WESTMINSTER.

GASHOLDER.

THE Directors of the Isle of Thanet Gas Company are prepared to receive TENDERS for the Construction of a GASHOLDER, 108 ft. in diameter, at their works at Margate.
The plans and specification can be seen on application to Mr. H. E. JONES, Gas-Works, Stepney, E.
Tenders, endorsed "Gasholder," and addressed to the Chairman, are to be sent in to the Company's Office, at Margate, not later than Thursday, the 26th of Feb. inst.
The Directors do not bind themselves to accept the lowest or any tender.
THOS. C. FULLER, Secretary.

GASHOLDER TANK.

THE Directors of the Isle of Thanet Gas Company are prepared to receive TENDERS for the Construction of a GASHOLDER TANK, 112 ft. in diameter, at their works at Margate.
The plans and specifications can be seen on application to the Engineer, Mr. H. E. Jones, Gas-Works, Stepney, London, and copies of same at the Thanet Gas Office at Margate.
Tenders, endorsed "Gasholder Tank," to be sent in to the Office of the Company, at Margate, addressed to the Chairman of the Gas Company, not later than Thursday, February 26, 1880.
The Directors do not bind themselves to accept the lowest or any tender.
THOS. C. FULLER, Secretary.

STAFFORD CORPORATION GAS-WORKS.

TO IRONFOUNDERS.

THE Gas Committee are prepared to receive TENDERS for and Fix a Wrought-Iron LATTICE GIRDER, 56 ft. 6 in. long and 4 ft. 6 in. deep, and also a HYDRAULIC MAIN.
Plans and specifications may be seen at the Gas-Works.
Sealed tenders, addressed as under, and endorsed "Tender for Ironwork," to be delivered on or before the 21st inst.
The Committee do not bind themselves to accept the lowest or any tender.
JNO. STORER, Manager.
Gas-Works, Stafford, Feb. 11, 1880.

GLASGOW CORPORATION GAS.

THE Committee of the Town Council on Gas Supply are prepared to receive TENDERS for the FIRE-CLAY RETORTS, FIRE-BRICKS, and FIRE-CLAY that may be required in their Works for Twelve months from May 1, 1880.
Specifications may be seen and forms of tender obtained on application to the Manager, at 42, Virginia Street, Glasgow.
Sealed offers, marked "Tender for Retorts," or "Fire-Bricks, &c.," to be addressed to the Committee of the Town Council on Gas Supply, and lodged at the Gas Office, 42, Virginia Street, on or before Tuesday, the 24th inst.
The Committee do not bind themselves to accept the lowest or any tender.
J. D. MARWICK, Town Clerk,
Clerk to the Committee.
City Chambers, Glasgow, Feb. 7, 1880.

SALE OF OLD MATERIALS.

THE Directors of the Rochester, Chatham, and Strood Gaslight Company are prepared to receive TENDERS for the Purchase of about 50 Tons of OLD IRON now lying at their Works, part at Rochester and part at Gillingham; also for Two 6-horse ENGINES, one Vertical or Table, the other Horizontal; and Two STEAM BOILERS, Cylindrical with Egg-ends, now lying at the Rochester Works.
Further particulars may be known on application at the Office, 56, High Street, Rochester, and the materials may be seen by applying to the Foreman at the Works.
Tenders may be for the whole or for any part of the materials, and must be delivered, sealed and marked "Tender for Old Materials," at the Office as above, before noon of Thursday, March 4 next.
The Directors do not bind themselves to accept the highest or any tender.
By order,
W. SYMS, Secretary.
Feb. 12, 1880.

CORPORATION OF BIRMINGHAM—GAS DEPARTMENT.

THE Gas Committee of the Corporation of Birmingham are prepared to receive TENDERS for the TAR to be produced at their various Works for a period of One, Three, or Seven years, from the 30th of June next.
The quantities produced in 1879 were as follows:—

Saltley Works	8,500 Tons.
Windsor Street Works	5,000 ,,
Adderley Street Works	2,500 ,,
Swan Village Works	3,000 ,,
Total	19,000 Tons.

The Committee will receive tenders, either at a fixed price per ton, or at a price to be calculated on a sliding scale, varying with the selling price of products.
The Corporation are prepared to let on lease a portion of their surplus land, on which Tar Works could be erected.
Forms of tender may be obtained on application to me.
EDWIN SMITH, Secretary.
Old Square, Birmingham.

Now Ready, Price One Guinea,

PRECEDENTS IN PRIVATE BILL LEGISLATION
AFFECTING GAS AND WATER UNDERTAKINGS.

COMPILED BY MR. G. W. STEVENSON, C.E., F.G.S.

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SMEATON'S TRAPLESS CLOSETS.

MESSRS. W. SMEATON & SONS,

HOT WATER AND SANITARY ENGINEERS.

PATENTEES AND INVENTORS OF THE
TRAPLESS, THE D TRAP, AND EDDYSTONE CLOSETS.
Also the New

ECLIPSE COMBINATION CAST LEAD TRAP.

The Price will be half of the old-fashioned D Trap, it being cast all in lead, without a Joint. Send at once for an Illustrated Price List to their Wholesale and Retail Agent,

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GAS MANAGER'S HANDBOOK.

By THOMAS NEWBIGGING, M.I.C.E.

Orders to be sent to

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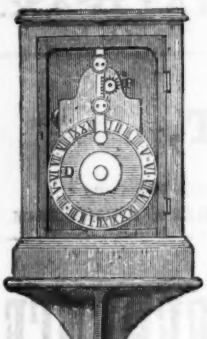
Price's Patent Lamplighters Tell-Tale,

OR TIME RECORDER.



This Instrument has been invented particularly for recording the hours of starting and return of Lamplighters from the Works, or any office, for the discharge of the duties of lighting and extinguishing Public Lamps; but it is also applicable to any establishment in which it is desired to obtain an unfailing record of the attendance or non-attendance of men at their posts at certain periods. Irregularity in the time of lighting Public Lamps leads to complaints, while neglect in extinguishing at the proper hour causes loss to Gas Companies, or, where the average meter system is in use, an excess of expenditure on the part of Local Authorities.

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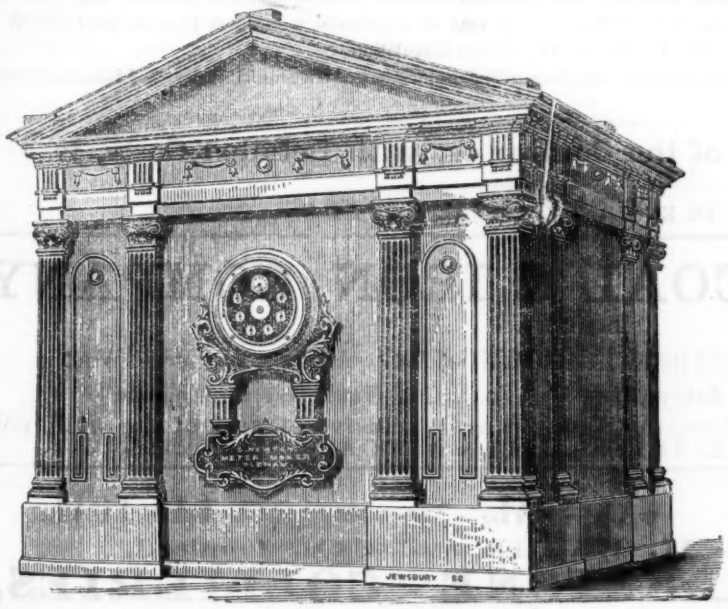
55, 55a, and 56, MILLBANK STREET, LONDON, S.W.

GEORGE NEWTON,

UNION STREET WEST, OLDHAM,



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SQUARE STATION-METERS, with PLANED JOINTS;

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WET AND DRY CONSUMERS GAS-METERS, GOVERNORS, &c.

NOW READY.—PRICE (BY POST) 4s.

THIRD EDITION, "Improvements in Gas Apparatus." By GEORGE ANDERSON.

With 22 Illustrations of Retorts, Purifiers, &c., &c.

Re-written and enlarged, with a chapter on the "Purification of Gas," by Mr. R. H. PATTERSON, late Metropolitan Gas Referee.

To be had of WALTER KING, "JOURNAL OF GAS LIGHTING" Office, 11, Bolt Court, FLEET STREET, E.C.; or of the Author, 35A, Great George Street, WESTMINSTER.

CORPORATION OF LEICESTER—GAS DEPARTMENT.

EXHIBITION OF GAS-ENGINES, COOKING-STOVES, BURNERS, AND OTHER APPARATUS.

THE Gas Committee of the Corporation of Leicester intend holding, from the 15th to the 17th of April next, an EXHIBITION of all kinds of Apparatus or Appliances showing the Advantages and Economical Uses of Gas for Engine, Cooking, Domestic, and other purposes. They will provide space, gas, and connections free, and give Certificates of Merit.

Intending Exhibitors will be furnished with printed conditions, forms for allotment of space, and any further information, on application to

G. A. AND C. S. ROBINSON, Managers.

Gas Offices, Millstone Lane, Jan. 23, 1880.

BOROUGH OF ST. HELEN'S.

EXHIBITION OF GAS COOKING AND HEATING STOVES, GAS-ENGINES, BURNERS, AND OTHER APPARATUS, AND INVENTIONS FOR THE ECONOMIC USE OF GAS FOR DOMESTIC AND MANUFACTURING PURPOSES.

THE Gas and Lighting Committee of this Borough have determined to hold an EXHIBITION of the above for three days—viz., Wednesday, Thursday, and Friday, the 10th, 11th, and 12th of March next, at the Town Hall, St. Helen's.

The Committee will provide space and gas free of charge, together with the necessary preparations for the gas connections.

Intending exhibitors will be furnished with printed conditions and forms of allotment of space, and any further information may be obtained upon application to the Manager, Mr. Jos. Hall.

Early application is invited, as no allotment will be made after Thursday, the 26th inst.

Corporation Gas Office, St. Helen's, Feb. 7, 1880.

GAS COALS.

THE Directors of the Commercial Gas Company are prepared to receive TENDERS for the Supply of Best GAS COALS, for One, Two, or more years, delivered at their respective Works as follows:—

Alongside the Stepney Works in the Regent's Canal.
" Wapping " River Thames.
" Poplar " Bow Creek.

The annual quantities to be spread over each year, and to be distributed between the works in the following proportions:—

Year ending June 30, 1881—	
Stepney	85,000 Tons.
Wapping	18,000 "
Total	103,000 Tons.
Year ending June 30, 1882—	
Stepney	85,000 Tons.
Wapping	35,000 "
Poplar	44,000 "
Total	164,000 Tons.
Year ending June 30, 1883—	
Stepney	85,000 Tons.
Wapping	35,000 "
Poplar	55,000 "
Total	175,000 Tons.

And in proportion for following years.

A specification of particulars of deliveries, terms of payment, and general conditions of contract, to be had on application.

Tenders, endorsed "Coal Tenders," to be forwarded not later than the 3rd of March next.

The Directors reserve the right of accepting any tender in part or in whole, and do not bind themselves to accept the lowest or any tender.

By order of the Board,
H. D. ELLIS, Secretary.

Gas-Works, Ben Jonson Road, Stepney,
Feb. 7, 1880.

THE

IMPERIAL METER CO.,

LIMITED,

Makers of THE IMPROVED DRY GAS-METERS, THE PATENT WET GAS-METERS, Special Meters for Public Lighting, STATION-METERS, Governors, &c.

KING'S ROAD, ST. PANCRAS.

Formerly also (Walter Ford) at Gray's Inn Road.

Now ready, price 18s., bound in cloth, gilt lettered,

THE THIRTY-FOURTH VOLUME

(JULY to DECEMBER, 1879,)

OF THE

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WATER SUPPLY, AND SANITARY IMPROVEMENT.

CLOTH CASES, GILT LETTERED,
For binding Vol. XXXIV., may be obtained,
PRICE . . . 2s. 6d.

LONDON:
WALTER KING, 11, BOLT COURT, FLEET STREET, E.C.

THE Gloucester Gas Company, ceasing to manufacture gas at their old works, will have the undermentioned APPARATUS for Sale about the beginning of August, viz.:—

110 Mouthpieces, D-shape, 13 in. by 22 in., with Wrought-Iron Lids, Cross-Bars, Stand, Bridge, and Dip Pipes. Also about 150 feet of D-shape Wrought-Iron Hydraulic Main, size 19 in. by 19 in. 28 Mouthpieces, D-shape, 16 in. by 20 in., with Wrought-Iron Lids, Cross-Bars, Stand, Bridge, and Dip Pipes. Also about 38 ft. of D-shaped Wrought-Iron Hydraulic Main, size 20 in. by 20 in. Annular Condenser, consisting of six Vertical Pipes, 24 in. diameter, 19 ft. high, with three 12 in. Slide-Valves and 12 in. Connections.

Scrubber (round), 5 ft. by 20 ft., with three 12-in. Slide-Valves, and 12 in. Connections.

Exhauster (Jones) to pass about 15,000 feet per hour.

Exhauster (Beales) to pass about 25,000 feet per hour.

Two Vertical Steam-Engines, each about 6-horse power, with Pulleys, and Shafting used for driving the above.

Boiler 14 ft. 6 in. by 3 ft. 6 in., with Centre Tube, and four Galloway Patent Tubes.

4-horse power Horizontal Steam-Engine.

Three 4-in. Pumps, with cranked Shafting and a pair Mitre Wheels.

Set of four Purifiers, 12 ft. by 12 ft. by 4 ft., with 12-in. Centre-Valve (Cockeys), and Connections and Lift complete.

Station-Meter by A. Wright and Co., London, with three 12-in. Slide-Valves, and 12-in. Bye-Pass and Connections, to pass about 25,000 feet per hour.

Gasholder, Double Lift, with Cast-Iron Tank, capacity 37,000 feet.

Gasholder, Double Lift, capacity 100,000 feet.

Gasholder, Double Lift, capacity 240,000 feet.

Two 12-in. Governors, by Wright, London, with 12-in Valves, Bye-Pass, and Connections.

Two 12-in. four-way faced Valves, by Cockey.

For further information, &c., apply to the undersigned.

R. MORLAND, Engineer.

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STATION-METERS GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,

And every description of Gas-Fittings and Gas Apparatus.

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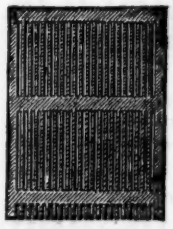

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SCRUBBERS FILLED WITH BOARDS,

On our approved principle, for the extraction of Ammonia.

Prices on application. References to First-Class Engineers.

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ECONOMY IN THE PRODUCTION OF GAS.

PLUTONIC CEMENT,

FOR JOINTING AND REPAIRING RETORTS AND OVENS *in* ACTION AND *out* OF ACTION.

A Pamphlet on the advantages of the above, with Modes of Application, References, Prices, &c., free by post, from the Sole Manufacturer,

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GAS & WATER ENGINEERS BOOK OF REFERENCE.

BY

GEO. BOWER, ST. NEOTS, HUNTINGDONSHIRE.

SECOND EDITION.

The first Edition of the *Gas Engineers Book of Reference* was published fourteen years ago, and it has long since been out of print. The present Edition has been almost entirely re-written, and it may be considered a business Treatise on Practical Gas Engineering, and there is, besides, a section devoted to Heating by Hot Water Circulation.

There are articles upon each branch of Gas Manufacture, together with Specifications, Memoranda, Rules, and Information useful to Engineers.

Price of the Book, 4s.; of the Companion, with Detailed Costs, 1s.

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THE WIGAN COAL & IRON COMPANY,

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Supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, &c.

N.B.—The Wigan Coal and Iron Company, Limited, are exclusive owners of the well-known HAIGH HALL AND KIRKLESS HALL GAS COAL COLLIERIES.

GAS COAL. GAS COAL. GAS COAL.

WELLS, BIRCH, RYDE, and CO., Limited,

HOYLAND SILKSTONE COLLIERIES,

Near BARNSLEY.

This Company is now in a position to raise 2000 tons per day of REAL OLD SILKSTONE GAS COAL.

"The quality of this Coal for Gas purposes, if equalled, is not excelled by any on record, and the Coke competes successfully with best Durham."—See *Mining Journal*, Aug. 11, 1877.

Prices quoted to any Railway Station, or F.O.B. Hull, Grimsby, Goole, Keadby, Liverpool, and Fleetwood.

Full particulars will be sent on application to above address.

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PRESSURE AND EXHAUST REGISTERS,

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And every Description of Gas Apparatus.

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DIRECT FROM THE

MARQUESS OF LONDONDERRY'S COLLIERIES.

COUNTY OF DURHAM.

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London Agents: Messrs. LAMBERT BROS., 85, GRACECHURCH ST., E.C.

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SOLE AGENTS FOR AND MANUFACTURERS OF

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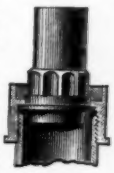
As Supplied to The Gaslight and Coke, Commercial, South Metropolitan, and other Companies.

These Unions practically place a Gas Company's property under lock and key, by rendering it impossible to disconnect at any joint at which gas can be obtained unregistered, without destroying the Company's Seal.

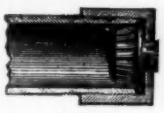
In fixing the Union (one being required on the main cock and another on the inlet only), some molten sealing-wax is poured into the recess on cap, and whilst hot impressed with Foulger's patent tong-shaped die, having the Gas Company's title engraved thereon; the wax being forced into the flutings on the lining, instant destruction of the Seal accompanies any attempt at disconnection.



SECTION.

FOULGER'S PATENT SEAL CUTTING-OFF CAPS

Cannot be taken off without destroying the Company's Seal. A tapered fluted plug (having been white-leaded or puttied) is inserted in the service-pipe. The cap (already filled with sealing-wax) is then screwed over, and tightens on a washer on the flange of plug. The wax is then warmed, and stamped with the engraved die. Absolute security against fraud and escape is thus obtained.



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A great advantage will also be recognized in stopping the gas instantly with the plug, and consequent immunity from the present source of danger occasioned by escape during fitting the ordinary cap, frequently in a confined position, and often occupying a considerable time.

Small additional cost over existing connections.

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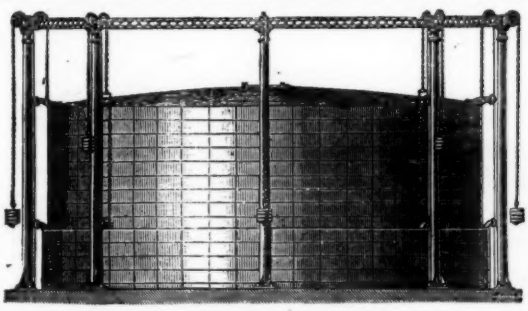

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GAS ENGINEERS & MANUFACTURERS,

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ESTIMATES FOR GAS-WORKS OF ANY SIZE.

REFERENCES TO 500 WORKS ALREADY ERECTED.

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PRICE'S PATENT COKE & COAL BARROW

effecting a great saving of time, labour, and expense.

For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, Gas-Works, Hampton Wick, MIDDLESEX.

Prices are Reduced.

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Patent Gas Calorigen,

A STOVE FOR

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RECOMMENDED BY DR. RICHARDSON.

MANUFACTURERS:

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BELGIAN CLAY RETORTS.

J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

Communications addressed to J. SUGG & Co., GHENT, will receive immediate attention.

JAMES NEWTON & SONS,

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FIRE-BRICK AND TILE MERCHANTS,

Wholesale and for Exportation,

FALCON DOCK, 78 AND 79, BANKSIDE,

SOUTHWARK, LONDON, S.E.,

DEPÔT for STOURBRIDGE AND NEWCASTLE

FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY,

and every Article suitable for

GAS AND WATER WORKS.

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JOHN ROMANS, C.E., F.G.S.E.,

CONSULTING GAS ENGINEER

AND

CANNEL COAL FACTOR,

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Plans and Estimates furnished; Gas-Works, Apparatus, Pipes, Machinery, Fire Goods, &c., supplied, or Attested and Shipped for Exportation.

GAS-WORKS TAKEN ON LEASE.

MR. ROMANS has for upwards of 30 years been practically engaged in the Manufacture of Gas, and has, by extensive experiments, ascertained that by JUDICIOUS INTER-MIXTURE of the lighter with the heavier gases, much of the rich Hydrocarbons CAN BE SAVED, which otherwise ARE LOST, during the process of manufacture. He is therefore enabled to give advice to those who favour him with their orders for Cannel, as to the class which will secure for their standard of illuminating power the HIGHEST ADVANTAGEOUS RESULTS.

ANALYSIS AND PRICES FORWARDED ON APPLICATION.

WILLIAM SUGG,

GAS ENGINEER,

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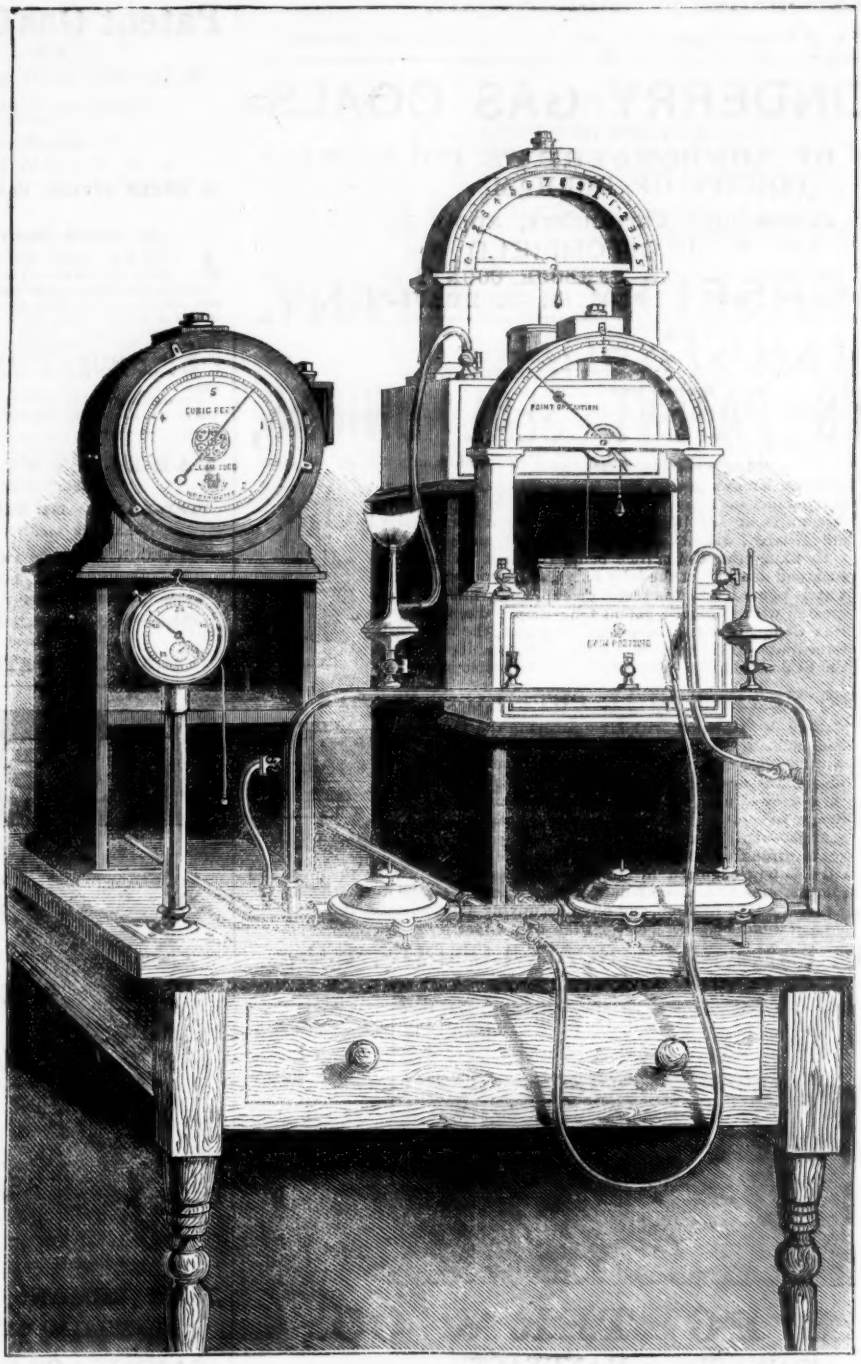
WESTMINSTER, S.W.

SUGG'S IMPROVED PATENT STREET LAMP METERS. (Kensington Pattern.)
IMPROVED STREET-LAMP GOVERNORS, COCKS, TORCHES, LANTERNS, COLUMNS (own Pattern),
and every requisite for Modern Street Lighting.

PRICES AND ILLUSTRATIONS ON APPLICATION.



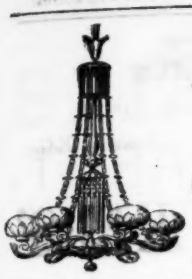
SUGG'S IMPROVED SYSTEM OF STREET LIGHTING WITH ARGAND BURNERS
of 50, 100, 200, and 400 CANDLE POWER.

PRICES AND PHOTOGRAPHS ON APPLICATION.

[Entered at Stationers' Hall.]

WILLIAM SUGG'S
IMPROVED APPARATUS FOR TESTING
STREET-LAMP GOVERNORS.

PRICES COMPLETE, AS ABOVE, ON APPLICATION.



F. & C. OSLER,

45, OXFORD STREET, LONDON, W.

MANUFACTORY AND SHOW-ROOMS:

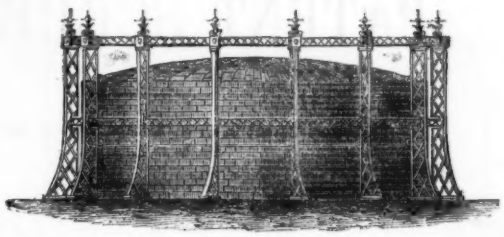
BROAD STREET, BIRMINGHAM.

ESTABLISHED 1807.

MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS, WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.

TABLE GLASS OF ALL KINDS.

CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.



THE HORSELEY COMPANY,

LIMITED,

TIPTON, STAFFORDSHIRE.

LONDON OFFICE:

6, WESTMINSTER CHAMBERS, VICTORIA STREET,

GAS ENGINEERS, IRONFOUNDERS, &c.,

MANUFACTURERS OF

GASHOLDERS, WROUGHT AND CAST IRON TANKS, CONDENSERS, PURIFIERS, SCRUBBERS, MAINS, RETORT-LIDS, PLAIN AND DISHED, LAMP-POSTS, PIPES,

AND ALL REQUISITES FOR EITHER

GAS OR WATER WORKS;

ALSO

MAKERS OF ROOFS, BRIDGES, &c.

S. OWENS & CO.,

WHITEFRIARS STREET, LONDON, E.C.,

HYDRAULIC ENGINEERS,

AND MANUFACTURERS OF

PUMPING MACHINERY of every Description.

SOLE LICENSEES AND MANUFACTURERS FOR GREAT BRITAIN OF

BLAKE'S PATENT STEAM-PUMPS,

More than 10,000 in use,

ESPECIALLY ADAPTED FOR USE IN GAS AND CHEMICAL WORKS, FOR PUMPING TAR, WATER, AMMONIACAL LIQUOR, ACIDS, &c.

The following are some of the prominent advantages of the BLAKE PUMP:—

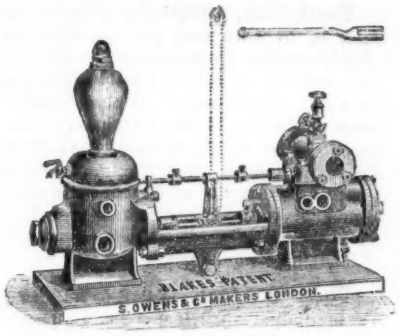
It will start at any point of stroke.

It has no dead point.

It works fast or slow, with the same certainty of action.

It is economical. Has a lead on the slide-valve.

It is compact and durable.



It is interchangeable in all its working parts.

It will deliver more water than any other pump.

It is made of best materials in the most workmanlike manner.

Can be worked at 20 strokes per hour, or 200 strokes per minute.

This Illustration represents Boiler-Feed Pumps, Sizes Nos. 1, 2, and 3, with Hand Lever for working Pump when Steam is not available.

SOLE MANUFACTURERS OF

MANN & OWENS

IMPROVED PATENT GAS-VALVES.

PRICED LISTS AND FULL PARTICULARS FURNISHED ON APPLICATION.

WANTED, by Samuel Thompson & Co., Colliery Office, Lancaster, APPLICATION for PRICES from Gas Managers who are prepared to receive Tenders for GAS COAL or CANNEL.

John Leigh, Esq., M.R.C.S., F.C.S., &c., &c., in his analytical report of S. T. & Co.'s Coal, says: "It is remarkable for its purity, I have scarcely ever examined a Coal containing so small a quantity of ash, and when Cannel of the best description is scarce, it may well replace this material."

T. NEWBIGGING,

CONSULTING GAS ENGINEER,

5, NORFOLK STREET, MANCHESTER.

HENRY LYON,

MECHANICAL AND CONSULTING GAS ENGINEER,

NORWOOD, NORTHENDEN ROAD,

SALE, NEAR MANCHESTER.

SANDELL AND SON,

PUBLIC ACCOUNTANTS,

2, GREAT GEORGE STREET, WESTMINSTER.

SANDELL AND SON having been engaged during the past 25 years in Gas Companies Accounts, either in Preparing or Investigating Statements for Parliamentary Applications, Arbitrations, and otherwise, offer with confidence their Services for similar purposes.

Mr. ROBERT DEMPSTER,

CONSULTING GAS ENGINEER,

ELLAND, near HALIFAX,

May be consulted on all matters connected with Valuations, Arbitrations, and Parliamentary Applications connected with Gas-Works. Having been engaged on extensive Arbitration Cases, which, combined with his experience in Construction and Contracting, his knowledge of Engineering and Valuations is both extensive and reliable.

ALFRED LASS, F.I.Accts.,

SPECIAL ACCOUNTANT FOR GAS AND WATER UNDERTAKINGS,

30, GRACECHURCH STREET, LONDON.

Accounts Analyzed and Statistics Prepared for Parliamentary Proceedings, Arbitrations, &c.

The Forms of Account, which have been specially designed by Mr. Lass to meet the requirements of the Gas-Works Clauses Amendment Act, 1871, are now in use by many Gas Companies, Corporations, and Local Boards.

HARPER & MOORES,

PROPRIETORS OF THE

BEST STOURBRIDGE CLAYS,

STOURBRIDGE.

Manufacturers of all Descriptions of

BEST STOURBRIDGE FIRE-BRICKS, LUMPS, AND CLAY RETORTS

Of all Dimensions for Gas-Works,

GLASS-HOUSE POTS & CRUCIBLES

ESTABLISHED 1836.

The Highest Award was obtained by H. & M., at the Philadelphia Exhibition, 1876, for Superior Quality of Manufacture. SILVER MEDAL, PARIS, 1878.

JAMES OAKES & CO.,

ALFRETON IRON-WORKS, DERBYSHIRE,

AND

WENLOCK IRON WHARF, 21 & 22, WHARF ROAD, CITY ROAD, LONDON, N.,

Manufacture and keep in stock at their works (also a large stock in London) PIPES and CONNECTIONS 1½ to 48 inches in diameter; and make to order Retorts, Purifiers, and Tanks, with or without planed joints, Columns, Girders, Special Castings, required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Syphons and Covers are joint-faced if required, doing away with millboard and iron boring, or Syphons made without Covers, a socket being cast on and fitted with a small plug about 6 inches in diameter with lead joint. In either way preventing leakage.

GAS AND WATER PIPES.

WILLIAM MacLEOD & CO.,

30, ST. ENOCH SQUARE, GLASGOW.

CAST-IRON GAS AND WATER PIPES.

DELIVERY F.O.B., GLASGOW.

Prices on application.

C. & W. WALKER,
8, FINSBURY CIRCUS,
LONDON, E.C.

MANN & WALKERS' PATENT SCRUBBER.

By Letters Patent in Great Britain, Europe, and the United States of America.

By some important improvements recently patented, the purifying power of these Scrubbers has been much increased, and a stronger ammoniacal solution obtained, which is found to absorb a large portion of the carbonic acid contained in gas, effecting an important saving in money and labour in the lime purifiers, and where oxide only is used, the increase in the illuminating power of the gas obtained by these Scrubbers is shown in a remarkable degree, in consequence of the large quantity of carbonic acid removed from the gas.

It is to be particularly noted that the important results of these Scrubbers do not depend upon the machinery alone. The entire internal construction of the Scrubber bears an almost equally important part. For this reason, where it is desirable to convert existing Scrubbers, whose dimensions happen to be suitable, the work commences by ripping out the whole of the interior of the shell, and beginning the internal construction *de novo* from bottom to top.

Fifty million cubic feet of gas per 24 hours are purified from ammonia by these Patent Scrubbers in a winter's day in the gas-works of London, where the purity of gas supply is the highest in the world, under the chemical restrictions of the Board of Trade.

Generally, wherever a high standard of purification is maintained in the chief cities and towns of the British Provinces and of Europe, these Scrubbers have become established.

By their use the department of purification from ammonia upon a gas-works is made complete, without the aid of prepared oxide of iron, chemicals in purifiers, or any other supplementary process, and the whole ammoniacal residual product contained in the coal is absorbed and obtained in the form most profitable to a gas company, while the requirements of all Acts of Parliament and of the Board of Trade, relating to incorporate gas companies, are satisfied.

Foul Gas, properly condensed, entering the inlet is, by once only passing through the Scrubber, completely purified from ammonia with regular certainty day by day, without any further trouble, or any other process, effected by a very small quantity of clear water let into the machinery room at the top of the Scrubber, which is discharged at the liquor outlet at the bottom, from Newcastle coal at about 18 to 20 ounces strength, from Yorkshire and other coals, generally from 25 to 30 ounces strength; while acidulated litmus or turmeric exposed at the Scrubber outlet will not show the slightest discoloration, and there is not a quarter of a grain of ammonia per 100 feet left unabsorbed.

They contain their own engine power, requiring only a small inappreciable quantity of steam from the gas-works boiler, and are then complete in themselves, ready for service.

Applications relating to dimensions and prices should be addressed to us, C. AND W. WALKER, 8, FINSBURY CIRCUS, LONDON, E.C., or to Mr. WILLIAM MANN, late Superintendent of the Chartered Gas-Works, BLACKFRIARS, LONDON; they should state approximately the largest make of gas in 24 hours on a winter's day, and the smallest make on a summer's day, to be purified.

THE

SILBER LIGHT COMPANY,

MANUFACTURERS OF

SILBER'S PATENT TUBULATED BURNERS

FOR

COAL OR AIR GAS,

And of SILBER'S BAT'S-WING GAS-BURNERS and every variety of Gas-Fittings.

ALSO MANUFACTURERS OF

EVERY DESCRIPTION OF LAMPS (burning Colza Oil, Petroleum, Paraffin, or Kerosene) FOR DOMESTIC PURPOSES, STREETS, RAILWAY STATIONS, SHIPS, &c., &c.

FIG. 1.
Silber's Patent Tubulated Gas-Burner, drawn full size.

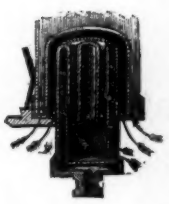


FIG. 2.
Section of Silber's Tubulated Gas-Burner, the arrows indicating the currents of air to the flame —two externally and two internally.
Dr. Wallace, F.R.S.E., Gas Analyst of Glasgow, says of this burner: "It gives the steadiest flame of any Argand yet constructed."

FIG. 3.
Silber's Tubulated Gas-Burner with glass bulb or vase beneath, and with larger inlet than aggregate outlet area, by which means the illuminating power for 5 cubic feet of 16-candle-light gas is increased one candle.

The Silber Tubulated Gas-Burner offers the following advantages over existing Argand Gas-Burners:—

1. It affords more light for 5 cubic feet of gas.
2. It is made of brass, and so put together that there is no liability of its melting, or coming to pieces in any other way, as burners made of soft metal are apt to do.
3. It is capable of burning from 4 to 7 cubic feet of gas per hour (by using chimneys of different lengths), and although the consumption be increased, **the illuminating power per cubic foot of gas remains almost quite constant.**
4. With the glass bulb or vase, as shown in fig. 3, the illuminating power for 5 cubic feet of 16-candle-light gas is **increased one candle.**

FIG. 4.
Silber's Bat's-Wing Gas-Burner.
The results obtained from this Burner are amongst the best obtained from any flat-flame Burners yet introduced.

FULL PARTICULARS & ENGRAVINGS

Forwarded on application to

THE SILBER LIGHT COMPANY,

49, WHITECROSS STREET,

LONDON, E.C.

FIG. 5.
Silber's Bat's-Wing Burner, with Opal Gas Moon.

ROBERT MARSHALL,

CANNEL COAL MERCHANT,

198, ST. VINCENT STREET, GLASGOW.

SHOTT'S BOGHEAD.

HARTHILL CANNEL

Yields 14,920 cubic feet of 40·92-candle gas per ton.

THRASHBUSH CANNEL

12,530 cubic feet of 40·22-candle gas per ton, and 9 cwts. of good coke.

LOTHIAN'S CANNEL

Yields 12,500 cubic feet of 34-candle gas per ton, and 9 cwts. of excellent coke, containing only 4 per cent. of ash.

MUIRKIRK, No. 1, CANNEL

Yields 12,160 cubic feet of 32·5-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash. This cannel is almost free from sulphur.

OLD WEMYSS CANNEL

Yields 13,320 cubic feet of 32·5-candle gas per ton.

Prices and full analyses on application at above address, or from Wedderspoon, Ferguson and Co., 21, Lime Street, London, E.C.

HEBBURN MAIN GAS COAL.

This Coal is now highly approved of for gas making, and yields over 10,000 feet per ton of 15-candle gas, and about 14 cwt. coke.

For references and prices, either f. o. b. or by rail, apply to

W. RICHARDSON,

29, QUAYSIDE, NEWCASTLE-ON-TYNE.

GAS COAL.

POPE & PEARSON, LIMITED, have now the authority of several of the most eminent Gas Engineers of London in stating that their Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17¼ candles.

One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

For further particulars, apply to Pope and Pearson, Limited, West Riding and Silkstone Collieries, near Leeds.

THE

SILICA FIRE-BRICK CO.,

OUGHTIBRIDGE

Near SHEFFIELD,

Manufacturers of THE ORIGINAL SILICA OR DINAS FIRE-BRICKS. Specially adapted for Gas-Retort Furnaces and for Siemens's Gas-Furnaces. Shipments promptly executed to London, Liverpool, Hull, Grimsby, &c.

BIRTLEY IRON WORKS,

CHESTER-LE-STREET, DURHAM.

Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.

Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

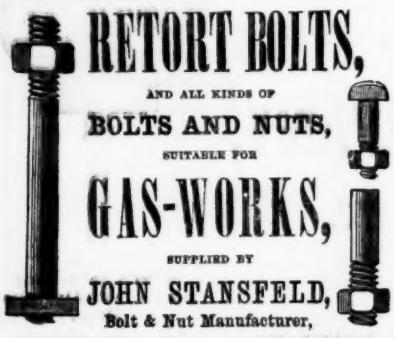
Agent in London, Mr. J. Manwaring, 101 Cannon Street, E.C.

M. BREMOND'S NAPHTHALINE PROCESS.

All negotiations respecting M. Brémond's patented process for preventing Deposits of

NAPHTHALINE

in Gas Main and Service Pipes should be addressed to Mr. W. H. Bennett, 22, Great George Street, Westminster, S.W., or to M. Bremond, Gas Engineer, Compania Madrilena de Alumbrado y Calefaccion por Gas, Madrid, who may be consulted upon all matters connected with the Gas Industry.



RETORT BOLTS,

AND ALL KINDS OF

BOLTS AND NUTS,

SUITABLE FOR

GAS-WORKS,

SUPPLIED BY

JOHN STANSFELD,

Bolt & Nut Manufacturer,

ALFRED ST., BOAR LANE, LEEDS.

FERRAND DAVIES,

148, GRESHAM HOUSE, OLD BROAD STREET, LONDON, E.C.,

AGENT FOR

THOMAS BARR'S LESMAHAGOW MAIN CANNEL,

AND

NEWTON, CHAMBERS, & CO.'S SILKSTONE GAS COALS.

Analyses and Quotations on application.

WILSON CARTER AND PEARSON,

GAS COAL AND CANNEL FACTORS,

Supply to any Railway Station or for Export all kinds of Fuel for Gas purposes.

Address—CHIEF OFFICES:

TEMPLE BUILDINGS, 50, NEW STREET, BIRMINGHAM.

GEORGE ANDERSON,

GAS AND CONSULTING ENGINEER,

35A, GREAT GEORGE STREET, WESTMINSTER, S.W.,

PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS—giving great Economy of Fuel.

STEAM-ENGINES and EXHAUSTERS, FOUR-WAY VALVES, WASHERS, SCRUBBERS.

FUEL-MACHINE, for Compressing Breeze and Tar.

N.B.—Pamphlet, with Twenty-Eight Illustrations and Letterpress, on the Construction of Gas-Works, post free, 4s. To be had of the Author; or at the Office of the "Journal of Gas Lighting."

PRICES AND ALL PARTICULARS TO BE HAD OF THE PATENTEE,

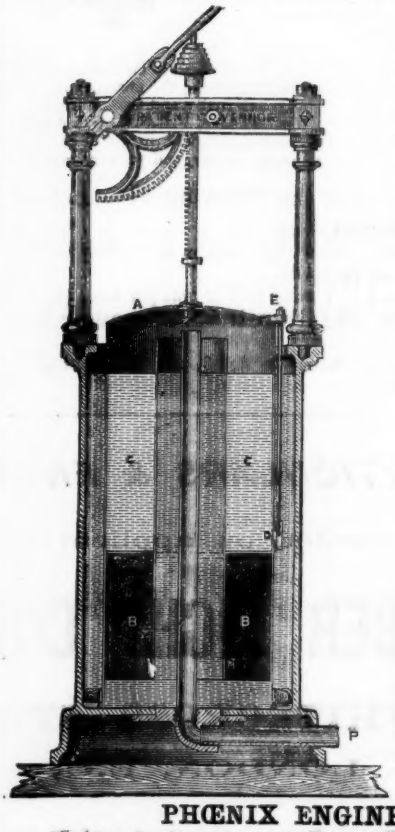
35a, GREAT GEORGE STREET, WESTMINSTER, S.W.

GEORGE WALLER & CO.,

GAS AND HYDRAULIC ENGINEERS,

Patent Compensating Steam Governor,

WITH SELF-CONTAINED WATER-BALANCE.



This is the most efficient and perfect Governor yet made to control and regulate the speed of Engines and Exhausters according to the varying make of gas, and maintain a steady gauge, whether working level or with six inches of seal.

It is the only Governor that will effectually control Condensing and Compound Engines, especially when the Exhauster is on light work, and the Engine is large.

During the drawing and charging of Retorts, the Engine requires no attention—a matter of great importance in small works.

Descriptive Circular sent on application.

They are in use at

BECKTON,
HAMPTON WICK,
DUKINFIELD,
HARTLEPOOL,
NEWCASTLE-ON-TYNE,
RAMSGATE,
SUTTON,

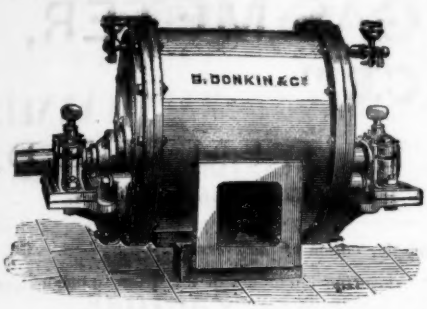
and about 30 other works.

G. W. and Co. make **special Steam Throttle Valves,** suitable for working with this Governor, and alter existing Throttle Valves to same plan.

See also advertisement, page 253.

PHŒNIX ENGINEERING WORKS,

Holland Street and Bear Gardens, Southwark, S.E.



NEW PATENT GAS-EXHAUSTERS.

[J. BEALE'S.]

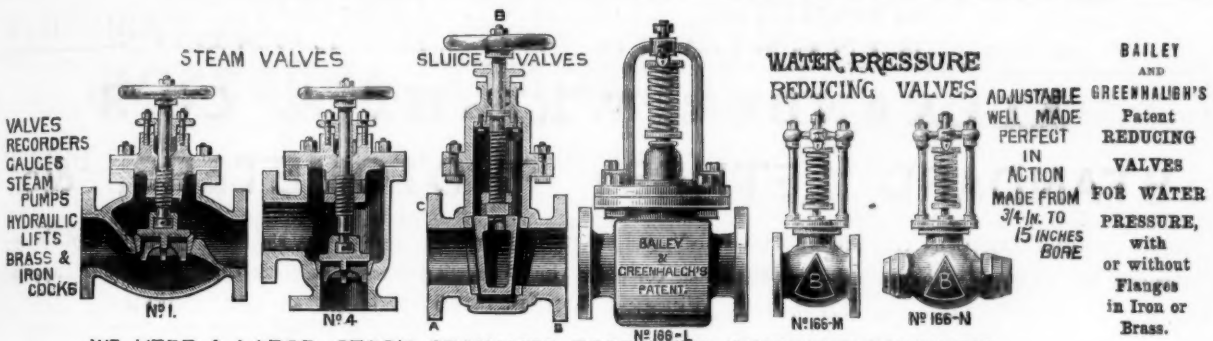
MESSRS. B. DONKIN & Co. possess the sole right to manufacture these Exhausters.

MADE WITH TWO OUTSIDE BEARINGS AND LATEST IMPROVEMENTS.

ALSO MANUFACTURERS OF

IMPROVED GAS AND WATER VALVES, STEAM-ENGINES, &c., &c.

B. DONKIN & Co., BERMONDSEY, LONDON.



WE KEEP A LARGE STOCK OF VALVES READY FOR IMMEDIATE DELIVERY.

W. H. BAILEY & CO., Valve and Cock Makers, General Brass Founders for Gas and Water Works, ALBION WORKS, SALFORD, MANCHESTER.

PARIS EXHIBITION, 1878.

THREE MEDALS

AND

HONOURABLE MENTION

HAVE BEEN AWARDED TO

JOSEPH CLIFF & SONS

For their Various Exhibits, amongst which is a

SILVER MEDAL

FOR THEIR

PATENT MACHINE-MADE

RETORTS AND FIRE-BRICKS,

Being the Highest Honour given for this class.

Established

1795.

JOSEPH CLIFF & SONS,

THE ORIGINAL

WORTLEY FIRE-BRICK WORKS,

NEAR LEEDS,

London Wharf: No. 4, inside Great Northern Goods Station, King's Cross, N. Liverpool: Leeds Street.

SPECIAL NOTICE.—Our Patent Machine-Made Retorts have now been thoroughly tested, and have proved themselves infinitely superior to those made by hand. At several large works it has been settled, beyond question, that, owing to the compactness and general excellence, more gas is sent to the gasholder from each ton of coal carbonized than is the case with hand-made Retorts.

GOLDSMITH'S PATENT SIGHT WATER-LINE INDICATING GAS-METER.

MANUFACTURED BY GUEST AND CHRIMES,

FOUNDRY AND GENERAL BRASS WORKS, ROTHERHAM; AND 35, SOUTHWARK ST., LONDON, S.E.

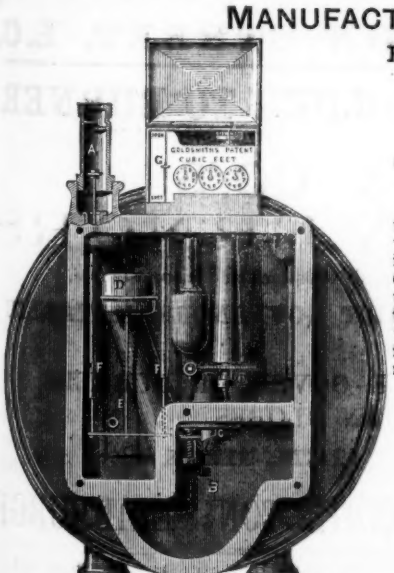


FIG. 1.—Three-light Meter, One-sixth Size.

Fig. 1 is a Meter with front removed to show the arrangement and connection of the Indicator and Valve.

Fig. 2 is front view of Index, with cover up.

The principal object of this invention is to render the water-line in the reservoir at all times visible. It will be seen, by reference to the illustrations, that this is accomplished in the following manner:—On the dial are the words "Open" and "Shut," and attached to the float is the pointer G, which rises and falls with the water-line in the reservoir. If the pointer is at "Open," it shows that the valve is open, and that the reservoir is full. If it is at "Shut," it shows that the reservoir is empty, and that the gas will be shut off.

The following ADVANTAGES will be obvious:—

1. The Inspector can see at a glance if the Meter requires water.
2. No more water than is required need be added, and therefore no water has to run out.
3. The Meter Inspector will be spared a great deal of his most objectionable work, and he will save a great deal of time and trouble.
4. The consumer will not always have to be asked for water, nor will he have to endure the unpleasant smell caused by waste water being run out.

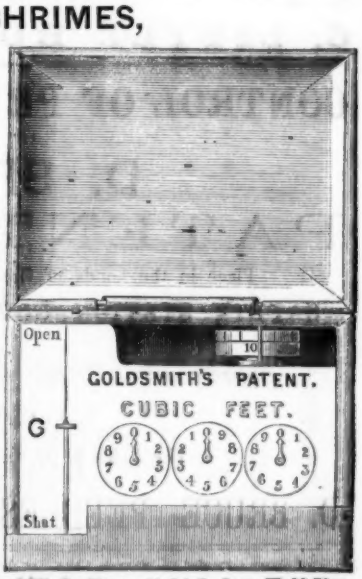


FIG. 2.—Three-light Index, Half Size.

NEW PATENT WET GAS-METER,

THE "RELIANCE,"

MANUFACTURED BY THE

GAS-METER COMPANY, LIMITED,

238, KINGSLAND ROAD, LONDON; UNION STREET, OLDHAM; HANOVER STREET, DUBLIN.

The object attained by this invention is the *correct measurement of Gas under every fluctuation of the pressure.*

Accuracy is obtained by subjecting the whole of the water which determines the measuring chambers of the drum to one uniform even pressure, and so prevents unequal displacements of the water-line.

The "RELIANCE" METER has been tested by several of the most experienced official meter inspectors. Copies of their reports may be obtained on application to the

GAS-METER COMPANY, LIMITED,
238, KINGSLAND ROAD, LONDON.

ALEXANDER WRIGHT & CO.'S

STANDARD LETHEBY PHOTOMETERS, &c.,

As made for the LONDON GASLIGHT COMPANY, and for many Provincial Corporations and Gas Companies, is the most Compact and Convenient Apparatus extant—sent out complete with Connecting Pipes. A. W. & Co.'s Photometric Apparatus has received the approval of the GAS REFEREES, AND IS USED BY THEM AT THEIR OFFICES.

ALL INSTRUMENTS REQUIRED FOR THE DETERMINATION OF THE QUALITY & PURITY OF COAL GAS.

LISTS ON APPLICATION.

55, 55a, & 56, MILLBANK STREET, LONDON, S.W.

R. LAIDLAW AND SON,

EDINBURGH AND GLASGOW.

Manufacturers of

CONSUMERS IMPROVED WET GAS-METERS,
THE UNVARYING WATER-LINE GAS-METERS,
IMPROVED DRY GAS-METERS, in Cast-Iron or Tin-Plate Cases;
STATION-METERS, ALL SIZES, up to 15 feet Square, with PLANED JOINTS;
Experimental Meters, Photometers, Pressure-Gauges,
Governors, Test Holders, &c., &c.

LONDON OFFICE:
6, LITTLE BUSH LANE, CANNON STREET, E.C.

CONTROL OF PRESSURE FROM GASHOLDER TO BURNER.

D. BRUCE PEEBLES & CO.'S
PATENT GAS GOVERNORS

Place in the hands of Gas Engineers the means of controlling Pressure in all situations and circumstances.

SAFETY STATION GOVERNORS, METALLIC DRY DISTRICT GOVERNORS, METALLIC NEEDLE LAMP GOVERNORS.

CONSUMERS GOVERNORS AND DOMESTIC NEEDLE-GOVERNOR BURNERS,
WITH GLOBE HOLDERS AND CORNELIAN GLOBES.

WET AND DRY GAS-METERS OF SUPERIOR EXCELLENCY, STATION-METERS, &c.

D. BRUCE PEEBLES & CO., TAY WORKS, BONNINGTON, EDINBURGH.

London: Printed by WALTER KING, for the Executors of the late WILLIAM BOUGHTON KING (at the office of Clayton and Co., 17, Bouverie Street, Fleet Street), and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, February 17, 1880.